MINUTES OF PROCEEDINGS

OF THE

ROYAL SOCIETY OF CANADA

1959

THIRD SERIES, VOLUME LIII

PROCÈS-VERBAUX

DE LA

SOCIÉTÉ ROYALE DU CANADA

1959

TROISIÈME SÉRIE, TOME LIII

OTTAWA
ROYAL SOCIETY OF CANADA

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1942—GAUVREAU, JEAN-MARIE, D.Sc.P., Officier d'académie (France), Directeur de l'Institut des arts appliqués de la province de Québec, 1097, rue Berri, Montréal (P.Q.)

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1959—BAGNANI, GILBERT F., D.Litt., Professor of Classics, University College, University of Toronto, Toronto, Ont.
1951—BAILEY, A. G., M.A., Ph.D., Dean of Arts and Professor of History, University of New Brunswick, Fredericton, N.B.
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1949—Puddington, I. E., M.Sc., Ph.D., Director, Division of Applied Chemistry, National Research Council, Ottawa, Ont.

1949—Purves, C. B., B.Sc., Ph.D., D.Sc., E. B. Eddy Professor of Industrial and Cellulose Chemistry, McGill University, Montreal, P.Q.

1954—Risi, Joseph, L.Sc., D.Sc., Faculty of Forest Engineering, Université Laval, Québec, P.Q.

1944—Robinson, Gilbert de B., M.B.E., Ph.D., Professor, Department of Mathematics, University of Toronto, Toronto, Ont.

1956—Robson, J. M., M.A., Branch Head, Nuclear Physics I, Atomic Energy of Canada Ltd., Chalk River, Ont.

1936—Rose, D. C., O.B.E., B.Sc., M.Sc., Ph.D., Principal Research Officer, Division of Physics, National Research Council, Ottawa, Ont.

1947—Sandin, R. B., M.Sc., Ph.D., University of Alberta, Edmonton, Alta.

1941—Sargent, B. W., M.B.E., M.A., Ph.D., R. Samuel McLaughlin Research Professor of Physics and Head of Department, Queen's University, Kingston, Ont.

1952—SCHERK, PETER, Ph.D., Professor, Department of Mathematics, University of Toronto, Toronto, Ont.

1951—SCHNEIDER, W. G., B.Sc., M.Sc., Ph.D., Principal Research Chemist, National Research Council, Ottawa, Ont.

1923—SHAW, A. NORMAN, M.A., D.Sc., LL.D., 2125 Sunset Rd., Montreal 16, P.Q.

1935—SHRUM, G. M., O.B.E., M.A., Ph.D., Professor and Head, Department of Physics, University of British Columbia, Vancouver, B.C.

1940—SMITH, H. GRAYSON, M.B.E., M.A., Ph.D., Head, Department of Physics, University of Alberta, Edmonton, Alta.

1943—SPINKS, J. W. T., M.B.E., D.Sc., Ph.D., Head, Department of Chemistry, and Dean of Graduate Studies, University of Saskatchewan, Saskatoon, Sask.

1934—STEACIE, E. W. R., O.B.E., M.Sc., Ph.D., D.Sc., LL.D., D. de l'U., F.R.S., President, National Research Council, Ottawa, Ont. (Past President)

1959—THIESSEN, G. J., B.Sc., M.Sc., Ph.D., Principal Research Officer, National Research Council, Ottawa, Ont.

1943—THODE, H. G., M.B.E., M.Sc., Ph.D., D.Sc., F.R.S., Vice-President, McMaster University, Hamilton, Ont.

1935—THOMSON, ANDREW, O.B.E., M.A., D.Sc., 36 Russell Hill Rd., Toronto 7, Ont.

1926—THORVALDSON, T., Commander, Order of the Falcon (Iceland), M.A., Ph.D., D.Sc., LL.D., University of Saskatchewan, Saskatoon, Sask.

1958—TUTTE, W. T., M.A., M.Sc., Ph.D., Assistant Professor, Department of Mathematics, University of Toronto, Toronto, Ont.

1948—VOLKOFF, G. M., M.B.E., M.A., Ph.D., D.Sc., Professor of Physics, University of British Columbia, Vancouver, B.C.

1957—WARD, ARTHUR G., M.A., Research Officer, Atomic Energy of Canada Ltd., Chalk River, Ont.

1959—WARREN, J. B., B.Sc., Ph.D., A.R.C.S., Professor of Physics, University of British Columbia, Vancouver, B.C.

1937—WATSON, W. H., M.A., Ph.D., Professor and Head, Department of Physics, and Director, Computation Centre, University of Toronto, Toronto, Ont.

1952—WELSH, H. L., M.A., Ph.D., Professor of Physics, University of Toronto, Toronto, Ont.

1955—WETMORE, F. E. W., M.A., Ph.D., Professor of Chemistry, University of Toronto, Toronto, Ont.

1957—WIESNER, K., D.Sc., Professor of Organic Chemistry, University of New Brunswick, Fredericton, N.B.

1935—WILLIAMS, W. L. G., M.A., Ph.D., D.ès-Sc., LL.D., Chemistry Building, McGill University, Montreal, P.Q.

1946—WINKLER, C. A., O.B.E., M.Sc., Ph.D., D.Phil.(Oxon.), Professor of Chemistry, McGill University, Montreal, P.Q.

1950—WOONTON, G. A., M.A., D.Sc., MacDonald Professor and Chairman, Department of Physics, Director Eaton Electronics, Research Laboratory, McGill University, Montreal, P.Q.

1956—WRIGHT, G. F., B.Sc., Ph.D., Professor, Department of Chemistry, University of Toronto, Toronto, Ont.

1954—WRIGHT, K. O., M.A., Ph.D., Astrophysicist, Dominion Astrophysical Observatory, Royal Oak, B.C.

1957—WU, TA-YOU, M.A., Ph.D., Senior Research Officer and Head of Theoretical Physics Group, National Research Council, Ottawa, Ont.

1951—WYMAN, MAX, B.Sc., Ph.D., Associate Professor of Mathematics, University of Alberta, Edmonton, Alta.

1958—YAFFE, LÉO, B.Sc., M.Sc., Ph.D., Associate Professor, Department of Chemistry, McGill University, Montreal, P.Q.

1956—ZASSENHAUS, H. J., M.A., Ph.D., Department of Mathematics, California Institute of Technology, Pasadena, California, U.S.A.

Section IV—GEOLOGICAL AND ALLIED SCIENCES

Retired Members

1920—Bancroft, J. Austen, Ph.D., D.Sc., Consulting Geologist, Anglo American Corporation of South Africa, Johannesburg, South Africa
1928—Boyd, W. H., B.A.Sc., 69 Dunvegan Rd., Toronto, Ont.
1928—DeLury, J. S., Ph.D., P.O. Box 22, Uxbridge, Ont.
1920—Graham, R. P. D., D.Sc., 775 Davaar Ave., Outremont, P.Q.
1930—Hanson, George, M.A., Ph.D., 27 Nolan Street, Ottawa, Ont.
1920—Knight, C. W., B.Sc., Consulting Geologist, 1545 Glenburnie Road, Port Credit, Ont.
1928—MacKay, B. R., B.Sc., Ph.D., 193 Carling Ave., Ottawa, Ont.
1932—Wright, W. J., M.A., Ph.D., LL.D., 117 Church St., Fredericton, N.B.

Active Members

1925—Alcock, F. J., Ph.D., 398 Third Ave., Ottawa, Ont.
1944—Ambrose, J. W., Ph.D., Professor of Geology, Queen's University, Kingston, Ont.
1950—Armstrong, J. E., M.A.Sc., Ph.D., Geologist, Geological Survey of Canada, 739 West Hastings St., Vancouver, B.C.
1957—Armstrong, H. S., M.A., Ph.D., Professor of Geology, Dean of Arts and Science, McMaster University, Hamilton, Ont.
1950—Auger, P. E., B.Sc., Ph.D., Professor of Geology, Laval University, Quebec, P.Q.
1958—Baird, D. M., B.Sc., M.S., Ph.D., Department of Geology, University of Ottawa, Ottawa, Ont.
1925—Bell, W. A., B.Sc., Ph.D., LL.D., 82 Terrace Street, New Glasgow, N.S.
1951—Berry, L. G., M.A., Ph.D., Professor of Mineralogy, Queen's University, Kingston, Ont.
1940—Bostock, H. S., M.Sc., Ph.D., Senior Geologist, Geological Survey of Canada, Ottawa, Ont.
1957—Boyle, R. W., B.A.Sc., M.A.Sc., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.
1951—Brownell, G. M., M.Sc., Ph.D., Professor and Chairman, Department of Geology and Mineralogy, University of Manitoba, Winnipeg, Man.
1955—Byers, A. R., M.Sc., Ph.D., Professor, Department of Geology, University of Saskatchewan, Saskatoon, Sask.
1948—Caley, J. F., M.Sc., M.A., Ph.D., Chief, Fuels and Stratigraphic, Geology Division, Geological Survey of Canada, Ottawa,Ont.
1953—Campbell, Neil, B.Sc., Ph.D., District Geologist, Consolidated Mining and Smelting Company, Trail, B.C.
1933—Clark, T. H., A.M., Ph.D., Logan Professor, Department of Geological Sciences, McGill University, Montreal, P.Q.
1943—Denis, B. T., B.Sc., Ph.D., Bureau of Mines, Quebec, P.Q.
1946—Derry, D. R., M.A., Ph.D., Vice-President, Rio Tinto Mining Company of Canada Ltd., 335 Bay St., Toronto, Ont.
1926—Dolmage, Victor, Ph.D., Consulting Geologist, 355 Burrard St., Vancouver, B.C.
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1950—Edmunds, F. H., M.Sc., Professor of Geology, University of Saskatchewan, Saskatoon, Sask.
1956—Folinsbee, R. E., B.Sc., M.S., Ph.D., Professor and Chairman, Department of Geology, University of Alberta, Edmonton, Alta.

1953—FORTIER, Y. O., B.Sc., M.Sc., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.

1950—FRASER, H. J., M.Sc., Ph.D., LL.D., c/o Ventures Ltd., 25 King St., West, Toronto, Ont. (Life Member)

1955—FREBOLD, HANS, D.Phil., Head, Section of Stratigraphic Palaeontology, Geological Survey of Canada, Ottawa, Ont.

1942—FRITZ, MADELEINE A., M.A., Ph.D., Professor of Geological Sciences, University of Toronto, Toronto, Ont.

1947—FURNIVAL, G. M., B.Sc., M.A., Ph.D., 24 Caperton St., Piedmont 11, California, U.S.A.

1959—GARLAND, GEORGE D., B.A.Sc., M.A., Ph.D., Associate Professor of Geophysics, University of Alberta, Edmonton, Alta.

1938—GILL, J. E., B.Sc., Ph.D., Professor of Geology, McGill University, Montreal, P.Q.

1935—GUNNING, H. C., B.A.Sc., S.M., Ph.D., Consulting Geologist, P.O. Box 1108, Salisbury, South Rhodesia

1955—GUSSOW, W. C., M.Sc., Ph.D., Union Oil Co., 709 8th Ave., West, Calgary, Alta.

1957—HAGE, CONRAD O., B.Sc., M.A., Chief Geologist, Dome Petroleum Ltd., Calgary, Alta.

1958—HARDY, R. M., B.Sc., M.Sc., D.Sc., Dean and Professor of Civil Engineering, University of Alberta, Edmonton, Alta. (Life Member)

1952—HARRISON, J. M., B.Sc., M.A., Ph.D., Director, Geological Survey of Canada, Ottawa, Ont.

1934—HAWLEY, J. E., M.A., Ph.D., Miller Memorial Research Professor and Chairman, Graduate Studies, Department of Geological Sciences, Queen's University, Kingston, Ont.

1947—HENDERSON, J. F., M.Sc., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.

1956—HEWITT, D. F., B.Sc., M.S., Ph.D., Geologist, Ontario Department of Mines, Toronto, Ont.

1958—HODGSON, JOHN H., M.A., Ph.D., Chief, Division of Seismology, Dominion Observatory, Ottawa, Ont.

1929—HUME, G. S., O.B.E., Ph.D., Westcoast Transmission Co., Ltd., Pacific Bldg., 9th Ave., Calgary, Alta. (Past President)

1940—HURST, M. E., M.A., Ph.D., Provincial Geologist, Ontario Department of Mines, Toronto, Ont.

1958—JACOBS, J. A., M.A., Ph.D., Professor, Department of Geophysics, University of British Columbia, Vancouver, B.C.

1954—JAMES, W. F., M.Sc., Ph.D., D.Sc., Consulting Geologist, Suite 1505, 320 Bay St., Toronto, Ont.

1919—JOHNSTON, R. A. A., B.A., 105 Old Forest Hill Rd., Toronto 10, Ont.

1943—JOLIFFE, A. W., M.A., Ph.D., Queen's University, Kingston, Ont. (Life Member)

1941—JONES, I. W., B.Sc., Ph.D., Bureau of Mines, Quebec, P.Q.

1948—KINDLE, E. D., M.A., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.

1951—LANG, A. H., M.A., Ph.D., Chief, Mineral Deposits Division, Geological Survey of Canada, Ottawa, Ont.

1940—LANGFORD, G. B., B.A.Sc., Ph.D., Head, Department of Geological Sciences, University of Toronto, Toronto, Ont.

1949—LAVERDIÈRE, l'abbé J. W., D.Sc., Département de Géologie, Faculté des Sciences, Boulevard de l'Entente, Québec, P.Q.

1956—LEGGET, R. F., B.Eng., M.Eng., Director, Division of Building Research, National Research Council, Ottawa, Ont.

1949—LORD, C. S., M.A.Sc., Ph.D., Chief Geologist, Geological Survey of Canada, Ottawa, Ont.

1959—MACKAY, J. ROSS, M.A., Ph.D., Professor, Department of Geography, University of British Columbia, Vancouver, B.C.

1952—MACKENZIE, G. S., M.A., Ph.D., D.Sc., University of New Brunswick, Fredericton, N.B.

1957—MATHEWS, W. H., M.A.Sc., Ph.D., Associate Professor, Division of Geology, University of British Columbia, Vancouver, B.C.

1933—MAWDSLEY, J. B., M.B.E., B.Sc., Ph.D., University of Saskatchewan, Saskatoon, Sask.

1947—MCGERRIGLE, H. W., Ph.D., Geologist, Quebec Department of Mines, Quebec, P.Q.

1927—MCLEARN, F. H., B.E., Ph.D., 817 Ivanhoe Ave., Britannia Heights (Ottawa), Ont.

1924—MOORE, E. S., M.A., Ph.D., LL.D., Department of Geological Sciences, University of Toronto, Toronto, Ont. (Past President)

1959—MOORHOUSE, W. W., M.A., Ph.D., Professor of Geological Sciences, University of Toronto, Toronto, Ont.

1937—NORMAN, G. W. H., B.A.Sc., Ph.D., Newmont Exploration Mining Co., 604-744 West Hastings St., Vancouver, B.C.

1945—OKULITCH, V. J., M.A.Sc., Ph.D., Professor and Chairman, Department of Geology, University of British Columbia, Vancouver, B.C.

1925—O'NEILL, J. J., M.Sc., Ph.D., D.Sc., 260 Metcalfe St., Ottawa, Ont. (Past President)

1937—OSBORNE, F. F., M.A.Sc., Ph.D., Professor of Petrology, Laval University, Quebec, P.Q.

1927—POITEVIN, EUGÈNE, C.E., B.A.Sc., D.Sc., 355 Wilbrod Street, Ottawa, Ont.

1946—RICE, H. M. A., M.A.Sc., Ph.D., Chief Geological Editor, Geological Survey of Canada, Ottawa, Ont.

1956—RIDDELL, J. E., B.Eng., M.Sc., Ph.D., Department of Geology, Carleton University, Ottawa, Ont.

1936—RICKABY, H. C., M.A., Deputy Minister of Mines, Parliament Bldgs., Toronto, Ont.

1954—ROBINSON, S. C., M.A.Sc., Ph.D., Chief, Mineralogy Division, Geological Survey of Canada, Ottawa, Ont.

1954—ROLIFF, W. A., B.Sc., Manager, Eastern Division, Producing Dept., Imperial Oil Ltd., 111 St. Clair Ave. West, Toronto, Ont.

1936—RUSSELL, L. S., B.Sc., M.A., Ph.D., LL.D., Director, National Museum of Canada, Ottawa, Ont.

1954—SATTERLY, JACK, M.A., Ph.D., Geologist, Ontario Department of Mines, Toronto, Ont.

1938—SLIPPER, S. E., B.Sc., 13051, 9th Ave., N.W., Seattle, Wash., U.S.A.

1955—SPROULE, J. C., B.Sc. M.A., Ph.D., J. C. Sproule and Associates, Geological Consultants, 1009-4th Ave., S.W., Calgary, Alta.

1949—STERNBERG, C. M., 169 Holmwood Ave., Ottawa, Ont.

1949—STEVENSON, J. S., B.A.Sc., Ph.D., Associate Professor of Mineralogy, McGill University, Montreal, P.Q.

1936—STOCKWELL, C. H., B.A.Sc., Ph.D., Chief, Precambrian Division, Geological Survey of Canada, Ottawa, Ont.

1939—SWANSON, C. O., M.A.Sc., Ph.D., Chief Geologist, Consolidated Mining & Smelting Co., Ltd., Trail, B.C.

1927—TANTON, T. L., M.A., Ph.D., Consulting Geologist, 9 Grosvenor Ave., Ottawa, Ont.

1945—THOMSON, J. E., M.A., Ph.D., Assistant Provincial Geologist, Department of Mines, Toronto, Ont.

1937—WALKER, J. F., B.A.Sc., Ph.D., 3014 Oakdowne Road, Victoria, B.C.

1945—WARREN, H. V., B.A.Sc., B.Sc., D.Phil., Professor, Department of Geology and Geography, University of British Columbia, Vancouver, B.C.

1931—WARREN, P. S., Ph.D., A.R.C.S., Professor Emeritus, University of Alberta, Edmonton, Alta.

1953—WATSON, J. W., M.A., Ph.D., Professor of Geography, Edinburgh University, Edinburgh, Scotland

1953—WEEKS, L. J., B.Sc., M.A., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.

1939—Wickenden, R. T. D., Ph.B., M.A., Ph.D., 406 Customs Bldg., Calgary, Alta.
1926—Williams, M. Y., B.Sc., Ph.D., Professor Emeritus of Geology, University of British Columbia, Vancouver, B.C.
1938—Wilson, Alice E., M.B.E., Ph.D., 328 McLeod St., Ottawa, Ont.
1948—Wilson, J. Tuzo, O.B.E., B.A., Sc.D., Ph.D., LL.D., D.Sc., Professor of Geophysics, University of Toronto, Toronto, Ont.
1924—Wilson, M. E., Ph.D., 22 Monkland Ave., Ottawa, Ont.
1932—Wright, J. F., Ph.D., Geologist, Geological Survey of Canada, Ottawa, Ont.

Section V—BIOLOGICAL SCIENCES

Retired Members

1924—Boyd, William, M.D., LL.D., D.Sc., 40 Arjay Crescent, Willowdale, Ont.
1936—Brittain, W. H., B.S.A., M.S., Ph.D., D.Sc., LL.D., Curator, Morgan Arboretum, Dept. of Woodlot Management, Macdonald College, P.Q.
1919—Cameron, John, M.S., D.Sc., M.R.C.S., 63 Grove Road, Bournemouth, England
1946—Craigie, James, O.B.E., M.B., Ph.D., D.P.H., F.R.S., Imperial Cancer Research Fund, Burtonhole Lane, The Ridgeway, Mill Hill, N.W. 7, London, England
1938—Drayton, F. L., B.S.A., Ph.D., 335 Fairmont Ave., Ottawa, Ont.
1921—Faull, J. H., Ph.D., 72 Fresh Pond Lane, Cambridge 38, Mass., U.S.A.
1931—Gussow, H. T., LL.D., F.R.M.S., Hon. F.R.H.S., 2605 Killarney Rd., Victoria, B.C.
1916—Hunter, Andrew, C.B.E., M.A., B.Sc., M.B., Ch.B., F.R.S.E., 2 Sultan St., Toronto, Ont.
1943—Kirk, L. E., M.S.A., Ph.D., Food and Agricultural Organization of U.N., Rome, Italy
1945—Leach, W., M.Sc., Ph.D., D.Sc., Dencross Terrace, Saanichton, B.C.
1932—Macallum, A. B., M.B., M.D., Ph.D., R.R. 3, Lunenberg, N.S.
1924—Macklin, C. C., M.B., M.D., M.A., Ph.D., D.Sc., 37 Gerrard St., London, Ont.
1937—Marrian, G. F., D.Sc., F.R.I.C., F.R.S., Department of Medical Chemistry, University of Edinburgh, Edinburgh, Scotland
1937—McDunnough, J. H., M.A., Ph.D., 386 Robie Street, Halifax, N.S.
1922—Miller, James, M.D., D.S.C., F.R.C.P.E., F.R.C.P.(C), Painswick House, near Strough, Gloucestershire, England
1922—Miller, F. R., M.A., M.B., M.D., F.R.S., 280 Carlton St., Toronto, Ont.
1930—Newton, Robert, M.C., B.S.A., M.Sc., Ph.D., D.Sc., LL.D., 703-710 Chilco St., Vancouver, B.C.
1922—O'Donoghue, C. H., D.Sc., F.R.S.E., University of Reading, Reading, England
1939—Scott, D. A., M.A., Ph.D., F.R.S., Research member, Connaught Medical Research Laboratories, University of Toronto, Toronto, Ont.
1915—Walker, E. M., M.B., 120 Cheltenham Ave., Toronto, Ont.
1934—Wardle, R. A., M.Sc., Professor Emeritus of Zoology, University of Manitoba, Winnipeg, Man.

Active Members

1944—Anderson, J. A., M.Sc., Ph.D., Chief Chemist, Board of Grain Commissioners for Canada, Winnipeg, Man.
1939—Anderson, R. M., B.Ph., Ph.D., 58, The Driveway, Ottawa, Ont.
1937—Bailey, D. L., M.S., Ph.D., Professor of Plant Pathology, University of Toronto, Toronto, Ont.
1952—Bannan, M. W., Ph.D., Associate Professor of Botany, University of Toronto, Toronto, Ont.

1958—Barr, Murray, L., M.D., M.Sc., Professor and Head, Department of Microscopic Anatomy, University of Western Ontario, London, Ont.

1958—Bélanger, L.-F., M.D., M.A. (Med. Sc.), Professeur titulaire d'Histologie et Embr., Faculté de Médecine, Université d'Ottawa, Ottawa (Ont.)

1956—Bernard, Richard, M.Sc., Ph.D., Professeur titulaire de physiologie animale, département de biologie, Université Laval, Québec (P.Q.)

1936—Berrill, N. J., Ph.D., D.Sc., F.R.S., Strathcona Professor of Zoology, McGill University, Montreal, P.Q.

1931—Best, C. H., C.B.E., M.A., M.D., D.Sc., LL.D., F.R.S., Professor and Head of Department of Physiology and Director of Banting & Best Department of Medical Research, Charles H. Best Institute, University of Toronto, Toronto, Ont.

1958—Bishop, C. J., B.Sc., A.M., Ph.D., Superintendent, Experimental Farm, Department of Agriculture, Kentville, N.S.

1956—Black, E. C., M.B.E., M.A., Ph.D., Associate Professor, Department of Physiology, University of British Columbia, Vancouver, B.C.

1939—Browne, J. S. L., B.Sc., M.D., C.M., Ph.D., LL.D., Professor and Chairman, Dept. of Investigative Medicine, McGill University, Montreal, P.Q.

1952—Burton, A. C., M.B.E., B.Sc., M.A., Ph.D., Professor of Biophysics, University of Western Ontario, London, Ont.

1957—Butler, G. C., M.A., Ph.D., Atomic Energy of Canada, Ltd., Chalk River, Ont.

1939—Cameron, T. W. M., T.D., M.A., Ph.D., D.Sc., M.R.C.V.S., Professor and Chairman, Department of Parasitology, McGill University, Director, Institute of Parasitology, Macdonald College, P.Q. (Past President)

1933—Campbell, W. R., M.A., M.B., M.D., F.R.C.P. (C), Medical Arts Bldg., Toronto, Ont.

1955—Cantero, Antonio, M.D., C.M., Director of Research, Notre Dame Hospital, Montreal Cancer Institute, Montreal, P.Q.

1925—Clemens, W. A., M.A., Ph.D., Professor Emeritus and Special Lecturer in Zoology, University of British Columbia, Vancouver, B.C.

1954—Collier, H. B., M.A., Ph.D., Professor and Head, Department of Biochemistry, University of Alberta, Edmonton, Alta.

1925—Collip, J. B., C.B.E., Ph.D., M.D., D.Sc., LL.D., F.R.S., Dean of Medicine, University of Western Ontario, London, Ont. (Past President)

1943—Cook, W. H., O.B.E., M.Sc., Ph.D., LL.D., Director, Division of Applied Biology, National Research Council, Ottawa, Ont.

1959—Copp, D. Harold, B.A., M.D., Ph.D., Professor and Head, Department of Physiology, University of British Columbia, Vancouver, B.C.

1959—Cormack, M. W., B.S.A., M.Sc., Ph.D., Director, Canada Agriculture Research Station, Saskatoon, Sask.

1957—Cormack, R. G. H., M.A., Ph.D., Professor of Botany, University of Alberta, Edmonton, Alta.

1946—Cowan, Ian McT., Ph.D., Professor and Head, Department of Zoology, University of British Columbia, Vancouver, B.C.

1935—Craigie, E. Horne, Ph.D., Professor of Comparative Anatomy and Neurology, Department of Zoology, University of Toronto, Toronto, Ont.

1936—Craigie, J. H., M.S., Ph.D., D.Sc., LL.D., F.R.S., Principal Plant Pathologist, Science Service, Department of Agriculture, Ottawa, Ont.

1945—Crampton, E. W., B.S.A., M.S., Ph.D., Professor and Chairman, Department of Nutrition, Professor of Animal Husbandry, Macdonald College, P.Q.

1949—Dansereau, Pierre, B.A., B.Sc.Agr., D.Sc., Institut de botanique, Université de Montréal, 4101 est, rue Sherbrooke, Montréal 36, (P.Q.)

1953—Dauphinee, James A., O.B.E., M.A., Ph.D., M.D., F.R.C.P.(C), Professor of Pathological Chemistry and Head of the Department, University of Toronto, Toronto, Ont.

1952—DAVIAULT, LIONEL, L.Sc.A., M.Sc., D.Sc., Officer in Charge, Laboratory of Forest Zoology, Science Service, Canadian Department of Agriculture, Quebec, P.Q.

1947—DOLMAN, C. E., M.B., B.S., D.P.H., Ph.D., F.R.C.P.(Lon.), Professor and Head, Department of Bacteriology & Immunology, University of British Columbia, Vancouver, B.C.

1951—DUGAL, L.-PAUL, O.B.E., M.Sc., Ph.D., Département de biologie, Université d'Ottawa, Ottawa (Ont.)

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1941—ETTINGER, G. H., M.B.E., M.D., C.M., D.Sc., Dean, Faculty of Medicine, Queen's University, Kingston, Ont.

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1949—FISHER, K. C., M.A., Ph.D., Dept. of Zoology, University of Toronto, Toronto, Ont.

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1949—FRAPPIER, ARMAND, O.B.E., M.D., L.ès Sc., Officier d'Académie, Professeur de bactériologie à la Faculté de Médecine, Doyen de l'Ecole d'Hygiène et Directeur de l'institut de Microbiologie et d'Hygiène de l'Université de Montréal, Montréal (P.Q.)

1948—FRY, F. E. J., M.B.E., M.A., Ph.D., Associate Professor of Limnology, Department of Zoology, University of Toronto, Toronto, Ont.

1952—GIBBARD, JAMES, B.S.A., S.M., Director, Laboratory of Hygiene, Department of National Health & Welfare, Ottawa, Ont.

1939—GIBBS, R. D., M.Sc., Ph.D., F.L.S., Professor of Botany, McGill University, Montreal 2, P.Q.

1955—GIBBONS, N. E., M.B.E., M.A., Ph.D., Head, Food Microbiology Section, Division of Applied Biology, National Research Council, Ottawa, Ont.

1941—GOULDEN, C. H., M.S.A., Ph.D., LL.D., B.S.A., Director, Experimental Farms Service, Department of Agriculture, Ottawa, Ont.

1948—GRACE, N. H., M.B.E., M.A., Ph.D., Director, Research Council of Alberta, Edmonton, Alta.

1938—GRAHAM, D. A., C.B.E., M.D., D.Sc., LL.D., F.R.C.P. (C) (London), 343 Lytton Boulevard, Toronto, Ont.

1951—GROVES, J. W., M.A., Ph.D., Head, Mycology Unit, Science Service, Department of Agriculture, Ottawa, Ont.

1957—HAIST, R. E., M.D., M.A., Ph.D., Professor of Physiology, University of Toronto, Toronto, Ont.

1944—HALL, G. E., M.S.A., M.D., Ph.D., D.ès Sc., LL.D., President and Vice-Chancellor, University of Western Ontario, London, Ont.

1951—HAM, A. W., M.B., Professor of Anatomy, Department of Anatomy, University of Toronto, Toronto, Ont.

1944—HANNA, W. F., C.B.E., O.L.M. (U.S.A.), M.Sc., Ph.D., LL.D., Bridgetown, N.S.

1956—HANES, C. S., Ph.D., Sc.D., F.R.S., Professor of Biochemistry, Department of Chemistry, University of Toronto, Toronto, Ont.

1943—HART, J. L., M.A., Ph.D., Director, Fisheries Research Board of Canada, Biological Station, St. Andrews, N.B.

1959—HART, J. SANFORD, M.A., Ph.D., Senior Research Officer, Division of Applied Biology, National Research Council, Ottawa, Ont.

1947—HAYES, F. R., M.Sc., Ph.D., D.Sc., G. S. Campbell Professor of Biology and Head of the Department, Dalhousie University, Halifax, N.S.

1953—HEIMBURGER, C. C., M.Sc.F., Ph.D., Biologist in charge of forest tree breeding, Ontario Department of Lands and Forests, Maple, Ont.

1955—HOAR, W. S., M.A., Ph.D., Professor of Zoology and Fisheries, University of British Columbia, Vancouver, B.C.

1951—HOPKINS, J. W., M.Sc., Ph.D., Division of Applied Biology, National Research Council, Ottawa, Ont.

1917—HUNTSMAN, A. G., B.A., M.D., Department of Zoology, University of Toronto (Oct. to May), St. Andrews, N.B. (May to Oct.) (Past President)

1933—HUTCHINSON, A. H., M.A., Ph.D., Emeritus Professor and Special Lecturer, Department of Biology & Botany, University of British Columbia, Vancouver, B.C.

1952—JAQUES, L. B., M.A., Ph.D., Professor and Head, Department of Physiology and Pharmacology, University of Saskatchewan, Saskatoon, Sask.

1950—JOHNSON, T., B.S.A., M.Sc., Ph.D., Officer in Charge, Plant Pathology Laboratory, Science Service, Canada Agriculture, Winnipeg, Man.

1950—KROTKOV, G., Agr. Eng., M.A., Ph.D., Professor of Biology, Queen's University, Kingston, Ont.

1945—LABARRE, JULES, B.Ph., L.ès S., D.ès S., Professeur de pharmacie, Université de Montréal, Montréal (P.Q.)

1946—LARMOUR, R. K., M.Sc., Ph.D., Director of Research, Maple Leaf Milling Co., Ltd., Toronto 9, Ont.

1951—LEBLOND, C. P., M.D., L.ès Sc., Ph.D., D.Sc., Professor of Anatomy, McGill University, Montreal, P.Q.

1949—LEDINGHAM, G. A., M.B.E., M.Sc., Ph.D., Director, Prairie Regional Laboratory, National Research Council Laboratories, Saskatoon, Sask.

1940—LOCHHEAD, A. G., M.Sc., Ph.D., Microbiology Institute, Canada Department of Agriculture, Ottawa, Ont.

1959—LUCAS, C. C., B.A.Sc., M.A.Sc., Ph.D., Professor, Banting and Best Department of Medical Research, University of Toronto, Toronto, Ont.

1956—MACINTOSH, F. C., M.A., Ph.D., F.R.S.C., Joseph Morley Drake Professor of Physiology and Chairman of Department, McGill University, Montreal, P.Q.

1944—MAHEUX, GEORGES, M.A., I.F., M.Sc.Ag., D.Sc., Professeur, Faculté de Génie forestier, Université Laval, Québec (P.Q.)

1941—MAINLAND, D., M.B., Ch.B., D.Sc., F.R.S.E., Professor of Medical Statistics and Chairman of Department, New York University College of Medicine, New York, N.Y.

1953—MCCALLA, A. G., M.Sc., Ph.D., Dean, Faculty of Graduate Studies, University of Alberta, Edmonton, Alta.

1942—MCFARLANE, W. D., M.A., B.Sc.(Agr.), Ph.D., Director of Research, Canadian Breweries Limited, Research Division, 307 Fleet St. E., Toronto, Ont.

1942—MCHENRY, E. W., M.A., Ph.D., Professor of Nutrition, School of Hygiene, University of Toronto, Toronto, Ont.

1945—MITCHELL, C. A., B.V.Sc., D.V.M., Kirk's Ferry, P.Q.

1936—MOLONEY, P. J., O.B.E., M.A., Ph.D., Connaught Laboratories, University of Toronto, Toronto, Ont.

1938—MOORHOUSE, V. H. K., M.C., B.A., M.B., M.D., 32 Amanda St., Orangeville, Ont.

1950—MORIN, J. E., M.D., M.C.R.M.(C), C.M.C.P.Q., 1581 Chemin St.-Louis, Québec, (P.Q.)

1947—MORRELL, C. A., M.A., Ph.D., Director, Food and Drug Division, Department of National Health and Welfare, Ottawa, Ont.

1938—Moss, E. H., M.A., Ph.D., Professor Emeritus of Botany, University of Alberta, Edmonton, Alta.

1938—Murray, E. G. D., O.B.E., M.A., L.M.S.S.A., M.D., D.Sc., Department of Medical Research, University of Western Ontario, London, Ont.

1958—Murray, R. G. E., M.A., M.D., C.M., Professor of Bacteriology and Immunology, University of Western Ontario, London, Ont.

1954—Neave, Ferris, M.Sc., Ph.D., Principal scientist, Fisheries Research Board, Biological Station, Nanaimo, B.C.

1945—Needler, A. W. H., O.B.E., M.A., Ph.D., D.Sc., Director, Fisheries Research Board, Biological Station, Nanaimo, B.C.

1942—Newton, Margaret, B.S.A., M.Sc., Ph.D., 2392 Beach Dr., Victoria, B.C

1950—Noble, R. L., M.D., Ph.D., D.Sc., Professor and Associate Director, Collip Medical Research Laboratory, University of Western Ontario, London, Ont.

1953—Orr, J. H., M.D., C.M., F.R.C.P.(C), Queen's University, Kingston, Ont.

1955—Pagé, E., M.B.E., B.S.A., Ph.D., Directeur, Département de biologie, Université de Montréal, Case postale 6128, Montréal (P.Q.)

1957—Panisset, M. G., B.A. (Paris), D.V. (Paris), D.V.M., Professeur titulaire, École d'Hygiène, Université de Montréal; Professeur École Vétérinaire de la Province de Québec, Montréal (P.Q.)

1935—Penfield, Wilder G., O.M., C.M.G., Litt.B., M.D., M.A., B.Sc., D.Sc., F.R.S., Professor and Chairman of Neurology and Neuro-Surgery; Director, Montreal Neurological Institute, Montreal, P.Q.

1948—Pomerleau, René, B.S.A., M.Sc., D.Sc., Lab. de biologie forestière, Faculté Génie for., Université Laval, Québec (P.Q.)

1946—Porsild, A. E., M.B.E., Ph.D., Chief Botanist and Curator of the National Herbarium of Canada, National Museum, Ottawa, Ont.

1942—Préfontaine, Georges, B.A., M.D., Lic.Sc., D.Sc., Hôpital Saint-Joseph de Rosemont, Montréal (P.Q.)

1953—Quastel, J. H., A.R.C.S., D.Sc., Ph.D., F.R.S., Professor of Biochemistry, McGill University, Montreal, and Director, McGill-Montreal General Hospital Research Institute, Montreal, P.Q.

1959—Radforth, Norman W., M.A., Ph.D., Professor, Department of Biology, Hamilton College, McMaster University, Hamilton, Ont.

1944—Rawson, Donald S., M.A., Ph.D., Professor and Head, Department of Biology University of Saskatchewan, Saskatoon, Sask.

1954—Raymond, Marcel, L.Sc., Botaniste, taxonomiste, Jardin Botanique de Montréal, Montréal (P.Q.)

1956—Rempel, J. G., M.Sc., Ph.D., Professor, Department of Biology, University of Saskatchewan, Saskatoon, Sask.

1957—Rhodes, A. J., M.B., Ch.B., M.D., F.R.C.P. (Edin.), Director, School of Hygiene, Professor of Microbiology, School of Hygiene, University of Toronto, Toronto, Ont.

1956—Ricker, W. E., M.A., Ph.D., Editor, Fisheries Research Board of Canada, Biological Station, Nanaimo, B.C.

1954—Rossiter, R. J., B.Sc., M.A., D.Phil., B.M.B.Ch., D.M., John Curtin School of Medicine, Australian National University, Canberra, Australia

1942—Rousseau, Jacques, B.A., L.Sc., D.Sc., Ph.D., 5208 Côte St-Antoine, Montréal, (P.Q.)

1941—Selye, Hans, M.D., Ph.D., D.Sc., Institut de Médecine et de Chirurgie Expérimentales, Université de Montréal, Montréal (P.Q.)

1955—Senn, H. A., M.A., Ph.D., Plant Research Institute, Central Experimental Farm, Dept. of Agriculture, Ottawa, Ont.

1946—Shaner, R. F., Ph.B., Ph.D., Professor of Anatomy, University of Alberta, Edmonton, Alta.

1935—SIFTON, H. B., M.A., Ph.D., Head, Department of Botany, University of Toronto, Toronto, Ont.

1940—SIMARD, L. C., M.D., F.R.C.P. (C), 624 Dunlop, Outremont (Montréal), P.Q.

1948—SOLANDT, O. M., O.B.E., B.Sc., M.A., M.D., D.Sc., M.R.C.P., LL.D., Vice-President, Research and Development, Canadian National Railways, 360 McGill St., Montreal, P.Q.

1951—SPEAKMAN, H. B., B.Sc., M.Sc., D.Sc., LL.D., 35 Strathearn Blvd., Toronto, Ont.

1953—STRICKLAND, E. H., M.Sc., D.Sc., 3012 Sea View Road, Victoria, B.C.

1957—TARR, H. L. A., M.S.A., Ph.D. (McGill), Ph.D. (Cantab.), Director, Technological Station, Fisheries Research Board, University of B. C. Campus, Vancouver, B.C.

1934—TAYLOR, N. B., M.D., M.R.C.S., F.R.C.S., 21 Ardwold Gate, Toronto, Ont.

1950—TEMPLEMAN, W., O.B.E., B.Sc., M.A., Ph.D., Director, Fisheries Research Board, Biological Station, St. John's, Newfoundland

1947—THOMPSON, I. M., B.Sc., M.B., Ch.B., F.R.S.E., Professor of Anatomy and Chairman of the Department, University of Manitoba, Winnipeg, Man.

1921—THOMPSON, W. P., M.A., Ph.D., D.Sc., LL.D., President, University of Saskatchewan, Saskatoon, Sask. (Past President)

1949—THOMPSON, W. R., B.S.A., D.Sc., Ph.D., F.R.S., Director, Commonwealth Institute of Biological Control, Ottawa, Ont.

1936—THOMSON, D. L., M.A., B.Sc., Ph.D., LL.D., Vice-Principal, Dean of the Faculty of Graduate Studies, Professor of Organic and Biological Chemistry, McGill University, Montreal, P.Q.

1950—TREMBLAY, J.-L., B.Sc.A., Ph.D., D.Sc., Département de Biologie, Faculté des Sciences, Université Laval, Québec, (P.Q.)

1955—VENNING, ELEANOR H., M.Sc., Ph.D., Associate Professor of Experimental Medicine, McGill University, Montreal, P.Q.

1958—WALKER, NORMA FORD, B.A., Ph.D., Department of Zoology, University of Toronto, and Director, Department of Genetics, Hospital for Sick Children, Toronto, Ont.

1930—WASTENEYS, H., Ph.D., Professor Emeritus of Biochemistry, University of Toronto, Toronto, Ont.

1943—WYNNE, A. M., M.A., Ph.D., Professor and Head, Department of Biochemistry, University of Toronto, Toronto, Ont.

1940—WYNNE-EDWARDS, V. C., M.A., Professor of Natural History, Marsichall College, University of Aberdeen, Aberdeen, Scotland

1935—YOUNG, E. GORDON, M.Sc., Ph.D., D.Sc., Director of the Atlantic Regional Laboratory, National Research Council, Halifax, N.S.

CORRESPONDING MEMBERS

SECTION I

DE LACRETELLE, JACQUES, de l'Académie française, Paris.

SECTION II

SIEBERT, WILBUR H., M.A., 182 West Tenth Ave., Columbus, Ohio, U.S.A.

SECTION IV

WATTS, W. W., Imperial College of Science and Technology, London, England.

MEDAL AWARDS

MÉDAILLE PIERRE CHAUVEAU

(Founded 1952)

1952—Pierre Daviault
1953—B. K. Sandwell, LL.D., D.C.L.
1954—Gérard Morisset, B.A., LL.L.
1955—Jean-Marie Gauvreau, D.Sc.Pol.
1956—Victor Morin, B.A., LL.D., O.I.P., Ch. Grand'Croix de l'Ordre du Saint-Sépulcre de Jérusalem
1957—Claude Melançon, D.ès S.
1959—Harry Bernard, B.A., L.ès L., D.ès L.

FLAVELLE MEDAL

(Founded 1925)

1949—W. P. Thompson, M.A., Ph.D., D.Sc.
1950—C. H. Best, C.B.E., M.A., M.D., D.Sc., F.R.C.P.(C), F.R.S., Hon. D.Sc.(Oxon.)
1951—Wilder G. Penfield, O.M., C.M.G., Litt.B., M.D., M.A., B.Sc., D.Sc., F.R.S.
1952—A. G. Huntsman, M.D.
1953—E. G. D. Murray, O.B.E., M.A., L.M.S.S.A., M.D., D.Sc.
1954—D. A. Scott, M.A., Ph.D., F.R.S.
1955—C. S. Hanes, Ph.D., Sc.D., F.R.S.
1956—George Lyman Duff, M.A., M.D., Ph.D.
1957—T. W. M. Cameron, T.D., M.A., Ph.D., D.Sc., M.R.C.V.S.
1958—A. G. Lochhead, M.Sc., Ph.D.
1959—Murray L. Barr, M.D., M.Sc.

HENRY MARSHALL TORY MEDAL

(Founded 1943)

1944—Frank Allen, M.A., Ph.D., LL.D.
1945—Otto Maass, C.B.E., M.Sc., Ph.D., LL.D., F.R.S.
1946—John S. Foster, B.Sc., Ph.D., F.R.S.
1947—E. F. Burton, O.B.E., Ph.D.
1949—H. S. M. Coxeter, Ph.D., F.R.S.
1951—T. Thorvaldson, A.M., Ph.D., D.Sc., LL.D.
1953—G. Herzberg, M.A., Dipl.Ing., Dr.Ing., F.R.S.
1955—E. W. R. Steacie, O.B.E., M.Sc., Ph.D., D.Sc., LL.D., D. de l'U. F.R.S.
1957—C. S. Beals, M.A., D.I.C., Ph.D., D.Sc., F.R.S.
1959—H. G. Thode, M.B.E., M.Sc., Ph.D., D.Sc., F.R.S.

LORNE PIERCE MEDAL

(Founded 1926)

1949—John Murray Gibbon, B.A., D. ès L.
1950—Marius Barbeau, LL.L., B.Sc., D. ès L., Dipl.Anth.
1951—E. K. Brown, B.A., D. ès L. (posthumously)

LORNE PIERCE MEDAL (*cont'd*)

1952—Hugh MacLennan, M.A., Ph.D.
1953—Earle Birney, Ph.D.
1954—Alain Grandbois
1955—William Bruce Hutchison
1956—Thomas H. Raddall, LL.D.
1957—A. M. Klein
1958—H. Northrop Frye, M.A., Ph.D.
1959—Philippe Panneton

TYRRELL MEDAL
(Founded 1928)

1949—Reginald G. Trotter, M.A., Ph.D., D.C.L.
1950—John Bartlet Brebner, M.A., B. Litt., Ph.D., Litt.D.
1951—Jean Bruchési, LL.L., D.Sc.Pol., D. ès L., and
D. G. Creighton, M.A., LL.D.
1952—C. B. Sissons, LL.D.
1953—Séraphin Marion, M.A., D. ès L.
1954—G. de T. Glazebrook
1955—C. P. Stacey, O.B.E., A.M., Ph.D.
1956—Mgr Olivier Maurault, C.M.G., P.D., LL.D., p.SS., D. ès L., D.C.L.
1957—George F. G. Stanley, M.A., B.Litt., D.Phil.
1958—W. L. Morton, B. Litt., M.A.
1959—Mgr Arthur Maheux, O.B.E., M.A., L.ès L., D.Th.

WILLET G. MILLER MEDAL
(Founded 1943)

1943—Norman Levi Bowen, M.A., Ph.D., Sc.D.
1945—Morley E. Wilson, Ph.D.
1947—F. H. McLearn, B.E., Ph.D.
1949—H. V. Ellsworth, M.A., Ph.D.
1951—J. E. Hawley, M.A., Ph.D.
1953—C. H. Stockwell, B.A.Sc., Ph.D.
1955—J. Tuzo Wilson, O.B.E., B.A., Sc.D., Ph.D. LL.D., D.Sc.
1957—J. E. Gill, B.Sc., Ph.D.
1959—L. S. Russell, B.Sc., M.A., Ph.D., LL.D.

THE HARRISON PRIZE AWARD
(Founded 1957)

1957—R. G. E. Murray, M.A., M.D., C.M., and C. F. Robinow, M.D.

PRESIDENTS

1949-1950 . . . Joseph A. Pearce, M.A., Ph.D., D.Sc.
1950-1951 . . . J. J. O'Neill, M.Sc., Ph.D.
1951-1952 . . . H. F. Angus, M.A., B.C.L., LL.D.
1952-1953 . . . G. B. Reed, O.B.E., M.A., B.Sc., Ph.D., LL.D.
1953-1954 . . . Jean Bruchési, LL.L., D.Sc.Pol., D. ès L.
1954-1955 . . . E. W. R. Steacie, O.B.E., Ph.D., D.Sc., F.R.S.
1955-1956 . . . G. S. Hume, O.B.E., Ph.D.
1956-1957 . . . W. A. Mackintosh, C.M.G., M.A., Ph.D., LL.D., D.C.L.
1957-1958 . . . T. W. M. Cameron, T.D., M.A., Ph.D., D.Sc., M.R.C.V.S.
1958-1959 . . . Pierre Daviault
1959-1960 . . . H. G. Thode, M.B.E., M.Sc., Ph.D., D.Sc., F.R.S.

LIST OF PRESIDENTS OF SECTIONS

SECTION I

1949-1950 . . . . . Le chanoine Georges Robitaille
1950-1951 . . . . . Donatien Frémont
1951-1952 . . . . . L'abbé Arthur Maheux
1952-1953 . . . . . Claude Melançon
1953-1954 . . . . . Gérard Morisset
1954-1955 . . . . . Jean Chauvin
1955-1956 . . . . . Eugène L'Heureux
1956-1957 . . . . . Jean-Marie Gauvreau
1957-1958 . . . . . Adrien Plouffe
1958-1959 . . . . . Maurice Lebel
1959-1960 . . . . . Léon Lortie

SECTION II

1949-1950 . . . . . A. G. Dorland
1950-1951 . . . . . W. A. Mackintosh
1951-1952 . . . . . A. S. P. Woodhouse
1952-1953 . . . . . A. R. M. Lower
1953-1954 . . . . . F. M. Salter
1954-1955 . . . . . D. A. MacGibbon
1955-1956 . . . . . J. S. Thomson
1956-1957 . . . . . W. Kaye Lamb
1957-1958 . . . . . F. H. Underhill
1958-1959 . . . . . V. W. Bladen
1959-1960 . . . . . G. B. Phelan

SECTION III

1949-1950 . . . . . C. S. Beals
1950-1951 . . . . . H. G. Thode
1951-1952 . . . . . Gerhard Herzberg
1952-1953 . . . . . R. L. Jeffery
1953-1954 . . . . . P. E. Gagnon
1954-1955 . . . . . R. M. Petrie
1955-1956 . . . . . W. H. Watson
1956-1957 . . . . . H. S. M. Coxeter
1957-1958 . . . . . Léo Marion
1958-1959 . . . . . G. M. Shrum
1959-1960 . . . . . G. de B. Robinson

SECTION IV

1949-1950	T. L. Tanton
1950-1951	P. S. Warren
1951-1952	G. S. Hume
1952-1953	G. Hanson
1953-1954	T. H. Clark
1954-1955	J. B. Mawdsley
1955-1956	J. E. Hawley
1956-1957	H. C. Gunning
1957-1958	H. C. Rickaby
1958-1959	L. S. Russell
1959-1960	F. F. Osborne

SECTION V

1949-1950	T. W. M. Cameron
1950-1951	L. C. Simard
1951-1952	C. L. Huskins
1952-1953	W. A. Clemens
1953-1954	R. D. Gibbs
1954-1955	E. G. D. Murray
1955-1956	Georges Maheux
1956-1957	W. H. Cook
1957-1958	W. R. Campbell
1958-1959	N. H. Grace
1959-1960	G. Krotkov

ASSOCIATED ORGANIZATIONS

The Canadian Institute of Mining and Metallurgy

THE ROYAL SOCIETY OF CANADA

REPORT OF THE HONORARY SECRETARY FOR THE YEAR 1958-9

COUNCIL MEETINGS

The Council held three meetings during the year to conduct the affairs of the Society. The Report of Council presented to the annual meeting of the Royal Society of Canada contains a complete account of the year's business.

The Sections recommended the election of twenty-eight Fellows. Their names, and the Sections to which they were elected, appear under "Annual Meeting."

Six medals were awarded by the Society:

Médaille Pierre Chauveau to M. Harry Bernard
Flavelle Medal to Dr. Murray L. Barr
Henry Marshall Tory Medal to Dr. H. G. Thode
Lorne Pierce Medal to M. Philippe Panneton
Tyrrell Medal to Mgr Arthur Maheux
Willet G. Miller Medal to Dr. L. S. Russell

(Citations are given on pages 47–54.)

The Right Honourable John G. Diefenbaker, Prime Minister of Canada, was elected an Honorary Fellow of the Society.

Only one Royal Society of Canada Scholarship was awarded for the academic year 1959–60 (Section I): a pre-doctoral scholarship to the Rev. Jean-Marie Nadeau of Rimouski (P.Q.). He will study classical literature and languages at the Sorbonne, Paris.

Two Rutherford Memorial Scholarships of $500 each were awarded, to supplement National Research Council post-doctoral Fellowships, to Dr. Philip Clifford Eastman who will study at the University of Bristol under Dr. Gibbs, and to Dr. Gerth Jones who will study at Oxford University under Professor D. H. Wilkinson.

The Awards Committee was again asked to receive and screen applications for the fourth series of fellowships offered by NATO. Twenty-two applications were received, and, in accordance with instructions, the best of these (not more than ten) were selected and forwarded to Paris, where the final selection was made by NATO's own Selection Committee. Mr. John H. McKay and M. Jacques Yvan Morin received awards.

At the request of the Embassy of the Federal Republic of Germany, the Committee dealt with applications received for four scholarships offered to Canadians by the West German Government, tenable in Germany for the academic year 1959–60.

The Council appointed a committee to study the structure of the science sections, the committee consisting of the President of the Society as Chairman, plus the President of each of the three science sections (or his nominee), plus one additional member from each science section to be selected by the President of the Society in consultation with the President of the Section concerned.

There were eight retirements: Gustave Lanctôt, Donatien Frémont, Section I; G. H. Stevenson, W. O. Raymond, Section II; R. C. Dearle, W. Boyd Campbell, Section III; R. A. Wardle, D. A. Scott, Section V.

Annual Meeting

The annual meeting was opened in Convocation Hall, Administration Building, University of Saskatchewan, at 10.00 A.M., June 1. The following Fellows registered:

Unattached

Mackenzie, C. J.

Section I

Audet, Louis-Philippe; Bernard, Harry; Brouillette, Benoît; Daviault, Pierre; Lamontagne, Léopold; Lebel, Maurice; Lortie, Léon; Maheux, Mgr Arthur; Parizeau, Gérard; Régis, le R.P. Louis-Marie; Sylvestre, Guy; Vinay, Jean-Paul.

Section II

Bagnani, Gilbert; Bissell, C. T.; Bladen, V. W.; Brady, Alexander; Britnell, G. E.; Brown, G. W.; Clark, S. D.; Coburn, Kathleen H.; Collin, W. E.; Corry, J. A.; Curtis, C. A.; Daniells, Roy; Easterbrook, W. T.; Ferguson, W. K.; Grube, G. M. A.; Johnson, A. H.; Keyfitz, Nathan; Kirkconnell, Watson; Long, M. H.; Longley, R. S.; MacGregor, D.C.; Macpherson, C. B.; McGregor, Malcolm F.; McIlwraith, T. F.; Morton, W. L.; Muckle, J. T.; Neatby, Hilda; Oleson, T. J.; Phelan, G. B.; Salmon, E. T.; Scott, F. R.; Stacey, Charles P.; Stanley, George F. G.; Talman, J. J.; Taylor, K. W.; Timlin, Mabel F.; Underhill, F. H.; Whalley, A. G. C.; Wilkinson, B.; Woodhouse, A. S. P.

Section III

Archibald, W. J.; Babbitt, J. D.; Blaikie, K. G.; Carmichael, Hugh; Currie, B. W.; Davies, F. T.; Derry, Douglas; Douglas, A. E.; Duckworth, H. E.; Duff, G. F. D.; Edwards, O. E.; Elliott, L. G.; Gagnon, Paul E.; Gaudry, Roger; Giguère, Paul-A.; Gishler, P. E.; Hachey, H. B.; Haslam, R. N. H.; Henderson, John T.; Herzberg, Gerhard; Hogg, Helen S.; Jeffery, R. L.; Johns, Martin W.; Katz, Leon; Kinsey, B. B.; Langstroth,

G. O.; Marion, Léo; McCallum, K. J.; McKinley, D. W. R.; McLay, A. B.; Mendelsohn, N. S.; Millman, P. M.; Misener, A. D.; Niven, C. D.; Puddington, I. E.; Robinson, G. de B.; Sargent, B. W.; Shrum, G. M.; Smith, H. Grayson; Spinks, J. W. T.; Steacie, E. W. R.; Thiessen, G. J.; Thode, H. G.; Thomson, Andrew; Thorvaldson, T.; Volkoff, G. M.; Warren, J. B.; Welsh, H. L.; Williams, W. L. G.

Section IV

Armstrong, H. S.; Byers, A. R.; Edmunds, F. H.; Folinsbee, R. E.; Fritz, Madeleine A.; Garland, G. D.; Hage, Conrad O.; Harrison, J. M.; Hume, G. S.; Jacobs, J. A.; Legget, R. F.; MacKenzie, G. S.; Mackay, J. R.; Mawdsley, J. B.; Moorhouse, W. W.; Okulitch, V. J.; Osborne, F. F.; Robinson, S. C.; Russell, L. S.; Sproule, J. C.; Sternberg, C. M.; Walker, J. F.; Warren, H. V.; Warren, P. S.; Wickenden, R. T. D.; Wilson, J. Tuzo.

Section V

Bailey, D. L.; Barr, Murray L.; Bélanger, L.-F.; Bishop, C. J.; Black, E. C.; Cameron, T. W. M.; Campbell, W. R.; Collier, H. B.; Cook, W. H.; Copp, D. H.; Cormack, M. W.; Cormack, R. G. H.; Cowan, Ian McT.; Craigie, E. Horne; Dauphinee, J. A.; Dunbar, M. J.; Fallis, A. Murray; Gibbard, James; Gibbs, R. D.; Gibbons, N. E.; Grace, N. H.; Ham, A. W.; Hart, J. S.; Hayes, F. R.; Jaques, L. B.; Johnson, T.; Krotkov, G.; Ledingham, G. A.; Lucas, C. C.; McFarlane, W. D.; Moss, E. H.; Murray, E. G. D.; Murray, R. G. E.; Radforth, N. W.; Rawson, Donald S.; Rhodes, A. J.; Senn, H. A.; Shaner, R. F.; Wardle, R. A.

The first general meeting was called to order by the President, M. Pierre Daviault, who welcomed the Fellows and their guests and expressed the gratitude of the Society to the University of Saskatchewan for its generosity in playing host to the Society. M. Daviault welcomed the Fellows in the following words:

This is the opening of the seventy-seventh Annual Meeting of the Royal Society of Canada. At this initial point of our meeting we usually hear a local speaker welcoming us. This year all our traditional plans have been upset, and you will have to be content with the welcome voiced by your President. If it is your loss, it is my gain, because it gives me great pleasure to welcome you to our meeting. But you may rest assured that I did not upset the usual plans in order to get that pleasure. I am not that Machiavellian and I am not that fond of public speaking, when I am doing the public speaking. As a matter of fact, I had very little to do with framing the plans, except in my humble capacity as a member of the Plans and Programme Committee of which Dr. T. W. M. Cameron is chairman. Our well-conceived programme is due entirely to him. However, some of you might recall that, at the beginning of his Presidential Address last year, Dr. Cameron said, after I had referred to him without due respect perhaps, that Scots and French have long been known as allies against the English. Be assured that there was nothing of the kind in the present case.

Veuillez croire que j'apprécie hautement l'honneur qui m'échoit de présider les présentes assises annuelles de notre Société et que j'ai conscience de la faiblesse de mes moyens pour mener cette tâche à bien. Inutile d'ajouter que je m'efforcerai, toutefois, de faire honneur à mon poste. Mettons, pour employer un langage qui m'est plus familier, que je ferai tout en mon pouvoir pour traduire le programme dans la réalité de nos réunions. Si je n'y arrive pas, comme nous sommes en démocratie, vous n'aurez qu'à me remplacer à la fin de notre réunion, ce que vous ferez de toutes façons, d'ailleurs.

Some years ago the Royal Society of Canada, at its Annual Meeting, stood alone in splendid isolation. Little by little other societies have acquired the habit of holding their own meetings at the same time, or around the same time, so that in one of our universities there is now a short season devoted to the Learned Societies. But, without undue humility, we may recall the fact that the place and time of this season of the Learned Societies is determined by our own Society, and the others follow as satellites. I mention this fact because I like to think that I come to the Annual Meeting of the Royal Society and not of Learned Societies generally.

And I see an indication of the paramount importance of our Society, importance owing less to the eminence of its Fellows (because it must be remembered that the other societies are composed mostly of Fellows of the Royal Society and are, in a way, offshoots of our Society) than to the universality of its activities in an age of extreme specialization.

The President called for a motion to approve the minutes of the last Annual Meeting. It was moved by M. Guy Sylvestre, seconded by Col. C. P. Stacey, that the minutes be approved. CARRIED.

The President asked the sectional presidents to introduce the new Fellows: Marcel Dubé, André Giroux, Léopold Lamontagne, Gérard Parizeau, Yves Thériault, Arthur Tremblay, Section I; Gilbert Bagnani, Donald O. Hebb, Nathan Keyfitz, Tryggvi J. Oleson, Arthur George C. Whalley, Rev. Frederick V. Winnett, Section II; Kenneth G. Blaikie, G. F. D. Duff, Oliver E. Edwards, P. M. Millman, G. J. Thiessen, J. B. Warren, Section III; R. J. W. Douglas, George D. Garland, J. R. Mackay, W. W. Moorhouse, Section IV; Douglas H. Copp, Melville W. Cormack, J. S. Hart, C. C. Lucas, R. B. Miller (posthumously), Norman W. Radforth, Section V.

The following citations were read by the Presidents of the Sections:

SECTION I

Marcel Dubé, né à Montréal en 1930, a fait ses études secondaires classiques au Collège Ste-Marie de Montréal. Bachelier ès arts et ancien élève de la Faculté des Lettres de l'Université de Montréal, M. Dubé fut boursier du gouvernement de la province de Québec en 1953 et de la Canada Foundation en 1958. Il est cette année boursier du Conseil des Arts. Auteur dramatique, créateur de télé-théâtres et de pièces radiophoniques, tout jeune encore, il est sans contredit, à l'heure actuelle, l'écrivain le plus prolifique du Canada. Il a écrit les œuvres suivantes : *Le Bal triste*, *De*

l'autre côté du mur, *Zone* (Trophée Calvet et Trophée Sir Barry Jackson), *La Nuit perdue*, *Chambres à louer* (Trophée Calvet), *Le Barrage*, *Le Naufrage*, *Le Temps des lilas* (cette dernière fut jouée dans toutes les provinces du Canada, voire à Paris, à Bruxelles et à Anvers). M. Dubé a composé cinq pièces pour la télévision et quatre pour la radio. Il a deux romans en préparation et plusieurs drames sur le métier. En plus de plusieurs articles de revues, de poèmes et de nouvelles, il a déjà fait paraître en librairie les ouvrages suivants : *Zone*, *Florence*, *Le Temps des lilas*, *Un Simple Soldat*. Il va bientôt publier un recueil de 200 poèmes et quelques œuvres dramatiques de son répertoire.

André Giroux, né à Québec en 1916, a fait ses études secondaires à l'Académie de Québec, affiliée à l'Université Laval. De 1936 à 1945, M. André Giroux fut secrétaire au secrétariat de la province de Québec. Et, depuis 1945, il est publiciste au Ministère de l'Industrie et du Commerce. Pendant deux ans, de 1938 à 1940, il fut rédacteur de la page éditoriale de la revue *Le Jeudi*. Tout au début de la seconde guerre mondiale, il fonda la revue *Regards*, dont il assuma la direction pendant deux ans. C'est en 1948 que parut à Montréal, avec Editions Variétés, son premier roman intitulé : *Au delà de visages*, qui valut à son auteur le Prix Montyon de l'Académie Française en 1949 et le Prix d'Action intellectuelle de la province de Québec en 1950. De 1950 à 1952, il composa 125 sketches à Radio Canada pour le programme radiophonique : *Trois de Québec*. En 1952, il fut boursier de la Fondation Guggenheim. L'an 1953 vit paraître à Québec son deuxième roman intitulé : *Le Grouffre a toujours soif*. De 1954 à 1957, il composa 125 scénarios pour la télévision canadienne d'expression française : *14, rue de Calais*, un téléroman hebdomadaire. En 1955, l'Office National du Film a tiré du roman *Au delà de visages* un film qui a pour titre : *L'Avocat de la défense*. M. Giroux passa l'année scolaire 1957–8 en France, titulaire d'une bourse du gouvernement canadien octroyée par la Société Royale du Canada; il profita de son séjour outre-mer pour faire des études sur le roman, le théâtre et la télévision. Il y a quelques mois, l'Institut Littéraire du Québec publiait le troisième ouvrage de M. Giroux : *Malgré tout, la joie*, un recueil de nouvelles d'une rare perfection de style.

Léopold Lamontagne, né en 1910, B.A. (Laval), M.A. licencié ès lettres (Laval), Ph.D. (Ottawa), docteur ès lettres de l'Université de Paris, est aujourd'hui le directeur du service des langues vivantes au Collège ou plutôt à l'Université Militaire Royale de Kingston, Ontario. Le lieutenant-colonel Lamontagne possède une riche expérience de l'enseignement des lettres, ayant tour à tour professé au Séminaire de Rimouski, au Collège Militaire de Kingston et aux Quartiers Généraux de l'armée canadienne. Ancien boursier du Conseil de Recherches dans les Sciences Sociales, du Conseil de Recherches sur les Humanités, de la Champlain Society, de la Société Royale du Canada et du gouvernement canadien, le Dr Lamontagne s'est montré digne de ces différents organismes culturels et compte à son crédit une longue liste d'articles de revues littéraires et scientifiques, et les ouvrages suivants : *La*

Gaspésie (3e édition), *Les Archives régimentaires des fusiliers du St-Laurent*, *Arthur Buies, homme de lettres* et *The Royal Fort Frontenac* en collaboration avec le Dr R. A. Preston de Kingston. Le lieutenant-colonel Lamontagne a prononcé aussi beaucoup d'allocutions et de conférences, non seulement au Canada et aux Etats-Unis dans les universités et à la radio, mais aussi en Europe, principalement en France, à la Sorbonne et à l'Université des Pyrénées.

Gérard Parizeau, né en 1899, a fait ses études à l'Ecole St-Léon de Westmount, au Collège Ste-Marie et à l'Ecole des Hautes Etudes Commerciales de Montréal. Licencié en sciences commerciales de l'Université de Montréal, il enseigne à l'Ecole des Hautes Etudes Commerciales, où il est professeur titulaire d'assurance. M. Parizeau est aussi un homme d'affaires, un fondateur d'œuvres et un ami des arts. Il dirige depuis plus de vingt-cinq ans la revue *Assurances*, qu'il a lui-même fondée en 1932; chaque livraison trimestrielle de la revue contient des articles de M. Parizeau, puis deux chroniques régulières : la chronique de documentation et la chronique dite : « connaissance du métier » . Son traité sur *L'Assurance contre l'incendie au Canada*, unique en son genre au pays, est devenu un ouvrage de base pour tous les spécialistes; son auteur en prépare une édition revue et augmentée. Il a aussi fondé en 1925 la revue intitulée : *L'Actualité économique*, à laquelle il collabore régulièrement. On sait que cette revue, hautement spécialisée, se consacre à l'étude de l'état et de la structure de l'économie canadienne. Il prépare actuellement un autre ouvrage traitant de l'évolution de l'assurance contre l'incendie. Membre du conseil d'administration de plusieurs compagnies d'assurance, et président de Gérard Parizeau Incorporé, courtiers d'assurance agrées, de Montréal, M. Parizeau trouve encore le temps d'écrire de nombreux articles techniques dans des revues spécialisées. Il s'intéresse aussi tout particulièrement à l'expansion des bibliothèques et des discothèques, surtout au Centre d'Art de Sainte-Adèle, auquel il a su imprimer une impulsion créatrice sans précédent.

Yves Thériault, écrivain bilingue, conteur, romancier, auteur radiophonique, scénariste, scripteur, est né à Québec en 1916, mais c'est à Montréal qu'il a fait toutes ses études. Il a écrit jusqu'ici plus de 1.200 émissions dramatiques pour la radio et la télévision au Canada, qui ont été retransmises en Belgique, en France, en Suisse et en Italie. Non content de collaborer régulièrement à des revues françaises, anglaises et américaines, où il publie des contes ou des nouvelles, il écrit même pour des revues de Hollande, d'Allemagne et de Scandinavie. Ont paru jusqu'ici sous son nom les ouvrages suivants : *Contes pour un seul homme* (1944), *La Fille laide* (1950), *Le Dompteur d'ours* (1950), *Les Vendeurs du temple* (1952), *Aaron* (prix de la province de Québec, édité à Québec, puis à Paris chez Bernard Grasset en 1954 et en 1958), *Agaguk* (premier prix de la province de Québec, édité conjointement à Québec et à Paris chez Bernard Grasset en 1958). *Agaguk* vient d'être traduit en japonais et en portugais. M. Thériault est aussi le récipiendaire du Trophée Laflèche, du Grand Prix

d'Art dramatique, Radio-Canada, de la Canadian Radio Award; ancien boursier du gouvernement français, il vient aussi d'obtenir une magnifique bourse du Conseil des Arts du Canada. *Le Marcheur*, pièce de théâtre créée à Montréal en 1950, a été plus d'une fois entendue sur les ondes de Radio-Paris, Radio-Genève, Radio-Bruxelles et Radio-Congo-Belge. M. Thériault collabore régulièrement à CBC Vancouver, CBC Toronto et CBC Winnipeg. Il est aussi fort bien connu à l'Office National du Film, où sa collaboration est constante.

Arthur Tremblay, né au Lac St-Jean en 1917, B.A. et M.A. en sciences sociales de l'Université Laval, M.A. en éducation de l'Université Harvard, est un ancien élève de l'Institut Jean-Jacques Rousseau de Genève et du Centre de Recherches pédagogiques de l'Université de Paris, où il a fait un stage de deux ans. Il est aujourd'hui le directeur-adjoint de l'Ecole de Pédagogie de l'Université Laval; il y professe et dirige le Centre de Recherches qui bénéficie d'une subvention de $125.000 de la Fondation Carnegie. Sociologue, éducateur, membre de plusieurs commissions d'enseignement, directeur d'études et de recherches, M. Tremblay a déjà publié de nombreux articles de revues et des rapports fort substantiels sur divers aspects de l'éducation. Il est aussi l'auteur des ouvrages suivants : *Etude sur la nation* (1942), *Orientation professionnelle* (1943), *Les Collèges et les écoles publiques : conflit ou coordination* (1954), *Les Problèmes des commissions scolaires* (1954), *Contributions à l'étude des problèmes et des besoins de l'enseignement dans la province de Québec* (1956). Il a aussi écrit une trentaine d'articles de revues et participé à plusieurs congrès internationaux d'éducation, sans compter qu'il est le principal animateur de l'Association d'Education du Québec et qu'il est attaché au Comité de Recherches de l'Association des Universités du Canada.

Section II

Gilbert Bagnani, D.Litt.(Rome), is Professor of Greek and Roman History in University College in the University of Toronto. He did distinguished archaeological work in Italy, Greece, and Egypt in the twenties and thirties. *The Roman Campagna and Its Treasures* is the most important publication of that period of his career. After an interval as a farmer at Port Hope, Dr. Bagnani joined the staff of the Department of Classics of University College. Since then he has published *The Arbiter of Elegance* and he is now engaged on an edition of the works of Petronius. From the reconstruction of sites he has turned to the reconstruction of texts, with equal distinction and with equal concern for the understanding of their human significance.

Donald O. Hebb, B.A.(Dalhousie), M.A.(McGill), Ph.D.(Harvard), is Professor of Psychology at McGill University. His recent election as President of the American Psychological Association is evidence of the wide recognition of his distinction. His early work with Dr. Wilder Penfield led him to a theory of behaviour which accounts for mental phenomena in

neurological and mechanistic terms. We welcome him with especial warmth because the discipline of psychology has been unrepresented in this Section since the retirement of Professor George Humphrey, and we note with pleasure that Professor Hebb was for one year a colleague of Professor Humphrey at Queen's University. We realize that he is likely to stray into Section V, but we hope he will come to feel at home in this Section. I regret that he is unable to be present today.

Nathan Keyfitz, B.Sc.(McGill), Ph.D.(Chicago), is Senior Research Statistician in the Dominion Bureau of Statistics. It is a very special pleasure for me to introduce him to the Society since he has recently accepted an appointment as a Professor of Sociology in the Department of Political Economy in the University of Toronto. He has achieved distinction in four distinct careers: as a mathematical statistician, as a demographer, as a student of the cultures of southeast Asia, and as consultant for programmes of economic development. The University of Toronto is proud of its new Professor; this Society will be equally proud of its new Fellow.

Tryggvi Julius Oleson, B.A., M.A.(Manitoba), Ph.D.(Toronto), is a Professor of History in the University of Manitoba. He is the author of *The Witenagemot in the Reign of Edward the Confessor* and co-author of volumes IV and V of *Saga Islendinga é Vesturheimi*. A mediaevalist of note he will add distinction to this Society.

Arthur George Cuthbert Whalley, B.A.(Bishops), M.A.(Oxon.), Ph.D.(London), is Professor of English in Queen's University. Three books, *Poetic Process*, *An Essay in Poetics*, *Coleridge and Sara Hutchinson and the Asra Poems*, testify to his scholarly achievement. Two volumes of poetry, *Poems, 1939–1944*, and *No Man an Island*, give him an additional claim to membership in a Section which prides itself on its creative writers as well as on its literary scholars, and which is particularly happy when (as is so often the case) the two roles are played by one Fellow.

The Reverend Frederick Victor Winnett, B.A., M.A., Ph.D.(Toronto), is Professor of Near Eastern Studies in University College in the University of Toronto. He acted as Director of the American School of Oriental Research in Jerusalem in 1950–1, and is again acting in this capacity in the present year. For that reason he is unable to be present today. Two books, *The Mosaic Tradition* and *Safaitic Inscriptions from Jordan*, have earned for him a very high international reputation in his field of scholarship.

Section III

Kenneth G. Blaikie is senior scientist, Shawinigan Chemicals Limited. He is one of the pioneers in industrial research in Canada and had a great deal to do with the building up in Shawinigan Chemicals of one of the first industrial research laboratories of real competence in Canada. His work on the early development of vinyl polymers is particularly outstanding. His

contributions to industrial chemistry have been noteworthy for their high scientific quality. He has given scientific direction to a great deal of work which has been published by others.

G. F. D. Duff is Associate Professor of Mathematics, University of Toronto. He graduated from the University of Toronto in 1948 and received his M.A. degree in 1949 on the basis of a paper published in the *Canadian Journal of Mathematics*; this is the only time the M.A. has been given in this way at Toronto. He was elected Proctor Fellow at Princeton 1950–1 and received his Ph.D. degree in 1951. In the following year he was Moore Instructor at Massachusetts Institute of Technology and joined the staff at Toronto in 1952. He is now Editor-in-Chief of the *Canadian Journal of Mathematics.*

Oliver Edward Edwards is Associate Research Officer, Division of Pure Chemistry, National Research Council. His early work with Professor Hurd led to a critical appraisal of Pictet and Castain's claim to have prepared 1,2-anhydroglucose, to the discovery of some interesting thermal isomerization and dehydration of dihydroxydihydropyran, and to the discovery and interpretation of some unusual reactions of lead tetraacetate with dihydropyran. His most important work has been in the field of alkaloids and indeed his contribution is outstanding. His major structural studies on aconite and delphinium alkaloids, started in 1950, have resulted in the discovery of an array of unusual reactions of the alkaloid lycoctonine which have been interpreted in the light of the complex structure of this base determined by X-ray crystallography. He has also contributed substantially to our knowledge of the structure of the alkaloid atisine, as well as doing first-rate work on unrelated alkaloids.

Peter MacKenzie Millman is Principal Research Officer, Radio and Electrical Engineering Division, National Research Council. He is the unchallenged international leader in meteoric spectroscopy. He has personally obtained more than 70 meteor spectra out of the all-time world total of only 200 specimens. For his work he received high recognition from the National Academy of Sciences in Washington. In addition to this specialty he can claim a varied and impressive list of accomplishments, first on the Faculty of the University of Toronto from 1933 to 1941, next as an Operational Research Officer with the R.C.A.F. until 1946, and then as Chief of the Stellar Physics Division of the Dominion Observatory up to 1955. Beginning in 1947 he pioneered in the application of radio techniques to meteoric astronomy and has consolidated his reputation in this new field. On joining the National Research Council in 1955 he has expanded these studies, and is taking a leading part in upper atmospheric research for the International Geophysical Year.

George J. Thiessen is Head of the Acoustics Section, Division of Applied Physics, National Research Council. He is Canada's outstanding acoustic physicist, and is very widely known in the United States and Europe. His principal researches include a definitive answer to the utility of sound for

repelling birds; the hearing of birds; radiation pressure; an R.C. filter which solved the low frequency filter problem which baffled many (it was incorporated in the Williamson high fidelity amplifier); an elegant application of acoustic theory to the suppression of noise from the couch drums; and the vibration modes of piezoelectric crystals. He directs a highly productive research group for whose inception he was responsible.

John B. Warren is Professor of Physics, University of British Columbia. He was born and educated in England, receiving his Ph.D. from the Imperial College, London, in 1936. His experience in physics has been wide: electron diffraction, radar in wartime, atomic energy at Chalk River, synchrotron construction at Glasgow, and finally construction of the University of British Columbia van de Graaff generator and, at present, research in nuclear reactions. He is the author or co-author of a number of scientific papers. He is respected by his colleagues and admired by his students for his enthusiasm for research and his wide interests and extensive knowledge not only in physics but in many other fields also. His achievements were recently recognized by an invitation from the National University of Australia to spend a year as visiting research professor at Canberra. We believe it would be fair to say that Dr. Warren is one of the most energetic, imaginative, and competent physicists in Canada.

Section IV

Robert John Wilson Douglas is a senior geologist of the Geological Survey of Canada who has devoted most of his professional life to study of the eastern Foothills of the Rocky Mountains, from the United States border to the lower regions of the Mackenzie Basin. His contributions to our knowledge of the complex structure and stratigraphy of this region have been widely recognized by the petroleum industry. His broad appreciation of the fundamental geology of the area is reflected in his thoughtful interpretation of his field studies. He is now completing maps and reports on Operation Mackenzie, one of the Survey's major airborne projects of which he was Chief.

George David Garland is a geophysicist who has achieved an international reputation for his work in comparing standards of gravity between Europe and North America and among Alaska, Canada, the United States, and Mexico. He has made observations and geological interpretations of the gravity and magnetic fields in various parts of Canada. More recently he has initiated work on studies of heat flow in the Western Canada Sedimentary Basin. He is now Associate Professor of Geophysics at the University of Alberta.

John Ross Mackay is an outstanding Canadian geographer who has done extensive work in the Arctic. The four main fields of geography which have engaged his interest are the Canadian Arctic, cartographic methods, physiography, and southeast Asia. During the war he was stationed at

Darwin, Australia, where he was Senior Intelligence Officer. Dr. Mackay's ability in his chosen field is indicated by the fact that he is Past President of the Canadian Association of Geographers and Past Vice-President of Pacific Coast Geographers, and is a Fellow of these and several other societies. He is currently Professor and Acting Chairman of the Division of Geography at the University of British Columbia.

Walter Wilson Moorhouse, Professor of Geology at the University of Toronto, is an internationally known authority on petrology. His field studies, supplemented by intense laboratory work, have led to conclusions of major importance to petrology and to geology generally. A brilliant student, Dr. Moorhouse received two medals from the University of Toronto and major fellowships at Cornell and Columbia. His own contributions are now being complemented by those of many students who have been attracted by his teaching.

Section V

Douglas Harold Copp, B.A., M.D., Ph.D., was born in Toronto on January 16, 1915, and received his early education and university training in that city. He was a scholarship student throughout and obtained his B.A. (Biological and Medical Sciences) in 1936. After completing his M.D. with honours in 1939 he proceeded to the University of California (Berkeley) and completed his Ph.D. in Biochemistry in 1943. He then joined the teaching staff and research division of the University of California and was successively lecturer in Biochemistry, instructor in Physiology, and assistant professor of Physiology. In 1950, he became Professor and Head of the newly formed Department of Physiology in the School of Medicine of the University of British Columbia. Dr. Copp has published numerous papers on the physiology and biochemistry of bone and calcium metabolism. He is a recognized authority on radiochemistry and has served on several of the international, national, and local committees concerned with the biological use of radioactive isotopes. His most recent assignment has been to the Second International Conference in Geneva on peaceful uses of atomic energy.

Melville Wallace Cormack, B.S.A., B.Sc., M.Sc., Ph.D., was born at Rossburn, Manitoba, in 1908. He is a graduate of the University of Manitoba and the University of Minnesota. He first joined the Botany and Plant Pathology Division of the Canada Department of Agriculture in 1928 and is now Director of the Canada Department of Agriculture Research Station in Saskatoon. His research has been concerned mainly with the diseases of forage crops and his important scientific contributions are those dealing with snow mould and root diseases of grasses and forage legumes. His studies on the low temperature basidiomycete causing winter killing of these crops and bacterial wilt of alfalfa, especially seed transmission, have been outstanding. He has also devised methods for testing for varietal

resistance in connection with the development of disease-resistant strains of alfalfa and other forage crops.

Jackson Sanford Hart, B.A., M.A., Ph.D., received his higher education at the University of Toronto and is now Head of the Animal Physiology Section, Division of Applied Biology of the National Research Council in Ottawa. He has gained international recognition for his outstanding studies of the physiological and biochemical adjustment of mammals and birds in cold acclimation. These demonstrated the occurrence in nature of metabolic acclimatization, and distinguished two categories of cold adaptation, insulative and metabolic, the former predominant among larger mammals and the latter among smaller mammals and birds. His comparisons of different modes of the production of heat by animals in cold environments have provided an insight into the basic adaptations of native species to the rigours of northern winters.

Colin Cameron Lucas, B.A.Sc., M.A.Sc., Ph.D. (Toronto), received his early scientific training at the University of British Columbia and his Ph.D. from the University of Toronto and has been a professor in the Banting and Best Department of Medical Research, University of Toronto, since 1946. From the beginning of his career he has worked steadily and productively in his chosen field and has published alone and jointly over seventy scientific papers. Early investigations include valuable chemico-hydrographic studies of the Gulf of Georgia. Later he carried out fundamental investigations concerning silicosis, lead poisoning, the sulphonamides, and protein metabolism. During the Second World War the first Canadian penicillin was produced under his direction and through his subsequent investigations he has become a world authority on choline, lipotropic activity, and fat metabolism.

Richard Birnie Miller, B.A., Ph.D. (Toronto), was a Professor of Zoology at the University of Alberta, a member of the National Research Council of Canada and the Fisheries Research Board of Canada, and was one of Canada's leading biologists. His interests were mainly in the fisheries problems of the Middle West and since receiving his doctorate twenty years ago he had published over sixty papers dealing with these. His most important contributions concerned the intricate biology of a tapeworm common in pike, whitefish, and lake herring in the Prairie regions. This research provided the information fundamental to the possible control of this very important parasite and was work of the greatest importance to Canadian fisheries. Professor Miller was not only an outstanding research worker but also a teacher of experience and ability and a tactful competent administrator.

Norman William Radforth, B.A., M.A., Ph.D. (Glasgow), was born in Lancashire, England, and came to Canada in 1920. He graduated from the University of Toronto in 1936 and received his Ph.D. from Glasgow University in 1939. His teaching career began at the University of Toronto and in 1946 he moved to McMaster University as Head of the Department

of Botany and Director of the Royal Botanical Gardens. His present position is that of Professor of Botany at McMaster University, Hamilton, Ontario. Dr. Radforth's research has been mainly in the field of palaeobotany. He investigated Northern Ontario lignites, principles of palaeoecology with particular reference to the coal and oil-bearing rocks, and has been active in the field of aerial interpretation of arctic and muskeg terrain.

Those present were formally presented to the President of the Society by the Presidents of the Sections. They received diplomas and signed the Charter Book. Dr. Kathleen Coburn, Section II, Dr. L. F. Bélanger, Dr. C. B. Bishop, Dr. A. M. Fallis, Section V, who had been elected in 1958 and Dr. A. W. Ham, Section V, elected in 1951, also received diplomas and signed the Charter Book. The following were absent: Marcel Dubé, André Giroux, Yves Thériault, Arthur Tremblay, Section I; Donald O. Hebb, Frederick V. Winnett, Section II; R. J. W. Douglas, Section IV.

The Honorary Secretary presented the Report of Council which was referred to the Sections.

The President read the following letter which had been sent to the Right Honourable John G. Diefenbaker inviting him to accept Honorary Fellowship in the Royal Society of Canada:

Ottawa, April 13, 1959.

The Right Honourable John Diefenbaker,
Prime Minister of Canada,
Ottawa, Ont.

Sir,

I have the honour to inform you that the Royal Society of Canada has expressed the desire to receive you in its ranks as an Honorary Fellow.

After it had been adopted by the Board of the Society, the relevant proposal received the warm approval of our five sections.

May I therefore ask you kindly to let me know whether you would agree to accept this appointment as Honorary Fellow of the Royal Society of Canada. Should you agree, the Society would consider itself highly honoured.

Please accept, Sir, the assurances of my highest consideration,

Respectfully yours,

Pierre Daviault
President.

The Prime Minister's reply was as follows:

Ottawa, April 16th, 1959.

Dear Mr. Daviault,

I wish to thank you for your letter advising me that I have been appointed an Honorary Fellow of the Royal Society of Canada.

This is indeed one of the highest honours that has been bestowed on me, and my grateful thanks are extended to you, the Officers and Members of the Royal Society of Canada for granting me the great privilege of joining your fellowship of eminent Canadians.

Again thanking you for doing me this honour, and with kind regards,

I am
Yours sincerely
John G. Diefenbaker

The meeting was adjourned at 11 A.M.

Sectional meetings were held on June 1, 2, and 3. The public was invited to hear the general symposium on Evolution.

A reception by the University of Saskatchewan was held on Monday, June 1, at 5.15 P.M., followed by a dinner for Fellows and wives. Dr. W. P. Thompson, President of the University of Saskatchewan, welcomed the Fellows and their wives in the following words:

I wish to welcome you to the University of Saskatchewan and to thank you for your decision to meet here and help us celebrate our golden jubilee. We are especially grateful that you were willing to incur the trouble and expense of meeting in the West for the second year in succession. Alberta has managed to get ahead of Saskatchewan not only in the founding of a university by one year, but in some other ways such as the discovery of oil and the pleasant consequences which flow from that discovery. But we are catching up even with respect to the oil. Of course, in some respects we do not care to follow her, and in some we like to think that we are ahead.

When I became a fellow of the Royal Society thirty-eight years ago, the Society met alone and moved year by year from Toronto to Montreal to Ottawa and back again to Toronto with occasional forays to such outlandish places as London or Kingston. I well remember the long debate which we had in Council the year I was President, 1948, about whether we should make the long trip to hold our meeting in Vancouver. In the ten years since then we have met three times in the West, once in Nova Scotia, and once in Quebec City. Evidently scholars can better afford such trips now or perhaps university authorities realize better the value of such meetings and are more generous with travel grants.

Now the Royal Society acts as the bell-wether of a large flock of learned societies (though some of us may not like to be compared to sheep, even the leading one which carries the bell). At any rate twenty-six other societies are following the Royal Society to Saskatoon and will be meeting here during the next two weeks. It is important to note that half of them have been organized during the last ten years. The number of scholars in the various fields and their scholarly activities have been increasing until they can now support so many societies which are worthwhile from the standpoints both of numbers of members and of volume of scholarly work. In other words Canada has grown up scientifically.

The Royal Society has performed a valuable service, even though it may have been done unconsciously or even reluctantly, in acting as the centre about which the other associations could group themselves. But I suggest it is time that we have a more definite organization for the whole group of societies, if only a conference of secretaries. It is conceivable that some of the Royal Society's young and vigorous offspring may feel that they have outgrown colonial status.

On Tuesday evening at 7 P.M., the Government of Saskatchewan gave a dinner in the dining room of the Hotel Bessborough to Fellows and their wives. Mr. Alan McCallum, Deputy Minister of Education, welcomed the Society. He presented the compliments and regrets of the Hon. W. S. Lloyd, Minister of Education, at being unable to attend the dinner. At this reception medals were presented to this year's winners, and the President gave his address entitled "The Evolution of the English and French Languages in Canada," "L'Evolution de l'anglais et du français au Canada."

The second general meeting of the Society was held at 4 P.M., Wednesday, June 3.

It was moved by Dr. L.-P. Audet, seconded by Dr. A. D. Misener, that the Report of Council be adopted. CARRIED.

The Report of the General Nominating Committee was read by Col. C. P. Stacey. The following officers were elected: President, H. G. Thode; Vice-President, M. Y. Williams; Honorary Secretary, Guy Sylvestre; Associate Honorary Secretary, S. C. Robinson; Honorary Treasurer, J. D. Babbitt; Honorary Editor, G. W. Brown; Honorary Librarian, W. Kaye Lamb. It was moved by Col. C. P. Stacey, seconded by Dr. T. W. M. Cameron that the Report of the General Nominating Committee be adopted. CARRIED.

Dr. H. G. Thode took the Chair and expressed his appreciation of the honour which the Society had paid him in electing him to the Presidency and stated that he would do everything he could to further the aims of the Society.

Reports were received from the Sections. It was moved by Dr. N. E. Gibbons, seconded by Dr. Léon Lortie, that the accounts of the Royal Society be audited again next year by the firm of Ross, Touche and Co., chartered accountants. CARRIED.

It was moved by Professor V. W. Bladen, seconded by Dr. N. E. Gibbons, that the Hon. Treasurer, Dr. J. D. Babbitt, and the Executive Secretary, Mrs. Lea Métivier, be given authority to handle the funds of the Royal Society of Canada. CARRIED.

Dr. H. G. Thode expressed the thanks of the Society to the outgoing President and Council for the excellent way in which they had conducted the affairs of the Society in 1958–9. Special thanks were extended to:

The outgoing President, M. Pierre Daviault, for his services as President and during the many years he had served on the Council.

The outgoing Honorary Treasurer, Dr. N. E. Gibbons, for the excellent and businesslike manner in which he had handled the funds of the Society during his three-year term of office.

The outgoing Honorary Secretary, Col. C. P. Stacey, for the years he had served on the Council. Col. C. P. Stacey, who served three years as Associate Honorary Secretary and two years as Honorary Secretary, had asked to be relieved of his appointment because he was joining the staff of the University of Toronto.

M. Pierre Daviault expressed the thanks of the Society to:

Dr. W. P. Thompson, President of the University of Saskatchewan, and to the University of Saskatchewan for their kindness in affording the Society the facilities of the University for this meeting and for the wonderful reception and banquet offered to the Fellows and their wives.

The Local Committee (Chairmen: Dr. Clarence Tracy, Dr. M. L. Cameron, and Mr. Norman Cram) for their co-operation in arranging all matters pertaining to the meetings.

The Government of Saskatchewan for the excellent dinner provided on Tuesday evening.

The Ladies' Committee.

The members of the Press and the C.B.C.

Dr. R. N. H. Haslam who acted as Liaison Officer.

Professor E. M. Jones for the presentation of the play entitled *Royalty is Royalty.*

The Executive Secretary.

The meeting was adjourned at 4.30 P.M.

Dr. H. G. Thode invited the new Council to meet at once in room 203, Administration Building, University of Saskatchewan.

PRESENTATION OF MEDALS

Médaille Pierre Chauveau

Harry Bernard

Monsieur le Président :

J'ai l'honneur de vous présenter pour la Médaille Pierre Chauveau M. Harry Bernard, docteur ès lettres, romancier et journaliste, directeur du *Courrier de Saint-Hyacinthe*.

Né à Londres en 1898, il fit ses études secondaires au Séminaire de Saint-Hyacinthe et ses études universitaires aux universités de Montréal et de Harvard. La première guerre mondiale terminée, il fut, de 1919 à 1923, rédacteur et correspondant parlementaire du *Droit* à Ottawa. Et depuis 1923 il est le directeur du *Courrier de Saint-Hyacinthe*. Il fut en 1939–40 président de l'Association des Hebdomadaires de langue française du Canada. En 1943, l'année même où il était élue membre de la Société Royale du Canada, la Foundation Rockefeller lui accorda une bourse de recherches aux Etats-Unis.

Le Dr Harry Bernard a obtenu à trois reprises le Prix David (1924, 1925, 1931), et s'est vu décerner six fois le Prix d'Action intellectuelle pour ses ouvrages; en 1951 il décrocha le Prix des Lecteurs offert par le Cercle du Livre de France. Son œuvre d'imagination comprend huit romans dont voici les titres : *L'Homme Tombé* (1924), *La Terre Vivante* (1925), *La Maison Vide* (1926), *La Dame Blanche* (1927), *La Ferme des Pins* (1930), *Juana, mon aimée* (1931), *Dolorès* (1932), *Les Jours sont longs* (1951).

L'auteur aborde tour à tour dans ces romans des problèmes de vie humaine et des problèmes de vie canadienne. Ce qu'il décrit le mieux et avec le plus de réalisme, ce sont les mœurs et les travaux des paysans. Il voit, il sait voir et il fait voir.

M. Bernard n'a pas écrit que des romans; il a publié aussi en 1929 un recueil fort pénétrant d'*Essais critiques* et en 1949 un ouvrage remarquable d'histoire et de critique littéraire intitulé : *Le Roman régionaliste aux Etats-Unis*. Aucun professeur, ancien critique littéraire au Canada français ne connaît mieux la littérature américaine que M. Harry Bernard. Il a aussi écrit en collaboration deux ouvrages : *Ville, ô ma ville* (1942) et *Portages et routes d'eau en Haute-Mauricie* (1953).

Losqu'il débuta dans le roman en 1924, il se révéla un fin observateur de la nature canadienne. Il fut même à cet égard, je dirais, comme un précurseur, montrant ainsi la voie aux écrivains d'imagination. Non content d'aimer la nature canadienne et de la faire aimer à ses lecteurs, il publia en 1946, en deux volumes, un guide fort précieux pour le jeune naturaliste canadien.

En juin 1919, il y a quarante ans ce mois-ci, Harry Bernard écrivait son premier article de fond en qualité de rédacteur. Il n'a jamais cessé d'écrire son éditorial depuis lors. L'écriture a toujours été et reste encore pour lui une colonne vertébrale.

C'est dans ces sentiments de haute estime et de vive admiration que je présente le Dr Harry Bernard pour la Médaille Pierre Chauveau.

MAURICE LEBEL

FLAVELLE MEDAL

Murray Llewellyn Barr

MR. PRESIDENT:

The Flavelle Medallist for 1959 is a scientist whose achievements have already won for him many honours, with excellent prospects of many more to follow. His classical discovery of a visible difference between the nuclei of somatic cells of males and females was greeted at first with incredulity. Then, as confirmation succeeded confirmation, incredulity was followed by delight among his friends and acclaim from a steadily increasing circle of admirers. There was peculiar satisfaction about a discovery of such a clear and definite fact of morphology which had eluded the sharp eyes of many thousands of microscopists for more than a century.

Dr. Barr was born in Belmont, Ontario. He attended primary schools in Belmont and London, Ontario, and secondary school in London, Ontario. In 1926 he entered the University of Western Ontario with a scholarship in French, but with his aim a career in medicine. In 1930 he received his B.A. in Honour Science with a gold medal. In 1933 he graduated M.D. and earned a place among the prize winners of his class. After a year as a rotating intern in the Hamot Hospital, Erie, Pennsylvania, he began general practice in London, Ontario.

Like many another young doctor who was starting practice in the early 1930's, he had more time to spare than was altogether pleasant. Some of it he spent in visits with the lecturer in physiology for chats about the hazards and frustrations of the young general practitioner. Some of it he used to acquire the techniques of Cajal for the staining of neurones. His continuing interest in the cytology of nerve cells enabled him, fourteen years later, to see what generations of microscopists had failed to see.

In 1936 he became an Instructor in the Department of Anatomy of the Faculty of Medicine, University of Western Ontario. Soon after the outbreak of the Second World War he joined the Medical Branch of the RCAF, in which he attained the rank of Wing Commander. After the war he returned to the Department of Anatomy of the University of Western Ontario as an Associate Professor. In 1951 he was promoted to full pro-

fessorship. His interest in aviation medicine did not cease with his resumption of academic work and from 1954 to 1956 he was chairman of the Panel on Aviation Medicine of the Defence Research Board.

It was in 1949 that there appeared in *Nature* a paper by Barr and Bertram entitled, "A morphological distinction between neurones of the male and female." Barr and Bertram had observed that in the nerve cell nuclei of some cats a small rounded body of chromatin was present beside the nucleolus. This body, however, could not be demonstrated in the nerve cell nuclei of other cats. They then searched for the reason for this particular difference in cats and were rewarded by finding that the presence or absence of this little body depended on the sex of the animal. It was present in females but not in males. They called the little body, seen to advantage only in the cells of females, the nucleolar satellite, because of its position.

This was the beginning of long and rewarding investigations into many hitherto obscure problems involving sex differences. Curiously enough the particular site where they first found evidence of a sex difference between the somatic cells of males and females proved to be the unusual instead of the usual one. As cells of other mammals and cells other than nerve cells were investigated, the little body of chromatin signifying the female was almost always found, not beside the nucleolus, but on the inner aspect of the nuclear membrane, and so the term nucleolar satellite was dropped and replaced by a more accurate one, the sex chromatin.

Although the sex chromatin cannot be distinguished in the somatic cells of all mammals it can be in most, including those of man. It became apparent that the probable reason for its being clearly visible in the somatic cells of females and not in males is due to the two X chromosomes in the nuclei of the cells of females forming a stainable mass of sufficient size to be resolved clearly with the light microscope. The XY combination in the somatic cells of males probably does not form a stainable mass of sufficient size to be clearly resolved.

As a result of Dr. Barr's work and confirmatory investigations by scores of other scientists, the chromosomal sex of humans can be determined by the microscopic examination of cells of the skin, blood, or samples taken from scraping of oral mucous membranes. It can also be used to determine the chromosomal sex of young embryos. The technique is relatively simple and is now widely used for the investigation of abnormalities of sexual development. The impetus which has been given to studies of such anomalies has been very great. A new method always creates new knowledge. The vistas which have been revealed by the discoveries and developments of Dr. Barr and his colleagues are yet to be fully explored. The Fellows of the Royal Society of Canada extend to Dr. Barr their congratulations for his contribution and their best wishes in his further quests. Mr. President, I ask you to present the Flavelle Medal to Murray L. Barr.

J. K. W. FERGUSON

Lorne Pierce Medal

Philippe Panneton

Mr. President:

His Excellency Philippe Panneton, Her Majesty's Canadian Ambassador to Portugal, is unable to be present this evening, but I am authorized by the Council to read his citation and to ask you to present the Lorne Pierce Medal to his representative, M. Lebel.

In truth, however, it is not His Excellency, nor even Doctor Panneton, whom I honour in this citation; it is his third self, Ringuet. In *Trente arpents* (1938) Ringuet painted an enduring picture of the tranquil farm life of the old parishes of Quebec; a life so satisfying to the weatherbeaten *habitants* of the older generation and so exasperating to the restless young men of the new generation. Of it my colleague David Hayne writes: "It marked both the culmination of a quarter century of regionalistic fiction and the opening of a new era of realism in the French Canadian novel. His book thus reaches back to Hémon's *Maria Chapdelaine*, and points forward to the urban realism of Gabrielle Roy and Roger Lemelin." In his *Le Poids du jour* (1949) Ringuet presented an even broader panorama of French-Canadian society, tracing the emergence of a new industrial middle class in the career of the tycoon Robert Garneau.

His ability as a writer of short stories is demonstrated in *L'Héritage et autres contes* (1946). His earliest venture in literature was as a parodist : « Littératures . . . à la manière de . . . » (1924). Alternating between fiction and history he published *Un Monde était leur empire* in 1943, and *L'Amiral et le facteur* in 1954.

It is, however, Ringuet the novelist whom we honour by the award of this medal. It has been for me a great pleasure to prepare for this presentation; the pleasure was in the reading of Ringuet rather than in the writing of this inadequate citation. Mr. President, I ask you to present the Lorne Pierce Medal to M. Lebel representing Ringuet, alias His Excellency Philippe Panneton.

V. W. Bladen

Médaille Tyrrell

Arthur Maheux

Mr. President:

It would be an honour and a pleasure to present Mgr Arthur Maheux for the Tyrrell Medal: but it seemed to me to be more appropriate that his citation should be prepared by the President of Section I, and that he should have the honour of presenting the Abbé. I therefore ask M. Lebel to present

to you Mgr Maheux that he may receive from you the medal he has so fully earned.

V. W. BLADEN

MONSIEUR LE PRÉSIDENT :

J'ai l'honneur de vous présenter pour la Médaille Tyrrell Mgr Arthur Maheux, O.B.E., historien et archiviste, professeur honoraire de la Faculté des Lettres de l'Université Laval.

Il y a soixante-quinze ans ce mois-ci le jeune Arthur Maheux voyait pour la première fois la lumière du jour dans la ville de Laurier au pays de Québec. Comme je n'appartiens pas à la citadelle de Saskatoon, je puis bien dire que Mgr Arthur Maheux ne pouvait naître sous de meilleurs auspices. Après de brillantes études classiques au Séminaire de Québec, il étudia à l'Université Laval où il obtint sa maîtrise ès arts dans les langues classiques et son doctorat en théologie. Il se rendit ensuite en France, à la Sorbonne, où il se spécialisa pendant cinq ans en histoire et en philologie. Mgr Maheux est licencié ès lettres (Sorbonne), diplômé d'études supérieures en philologie (Sorbonne), docteur en droit *honoris causa* (Frédéricton). Professeur né et administrateur né, Mgr Arthur Maheux participe activement à l'œuvre de l'Université Laval depuis quarante ans cette année. Il serait trop fastidieux de vous énumérer tous les diplômes universitaires qu'il a conquis, tous les postes qu'il a occupés dans l'enseignement et dans l'administration, toutes les sociétés savantes et culturelles dont il fait encore partie ou qu'il a soutenues pendant nombre d'années. Il est même, comme chacun sait, capitaine honoraire de l'armée canadienne et président général de l'Alliance Canadienne. Qu'il me suffise de vous dire ceci : il est déjà couvert de lauriers, mais le pays de Québec ne produit plus hélàs ! d'esprits aussi largement cultivés que lui. Lauréat de l'Académie Française (Médaille Richelieu) et de l'Académie Pontificale, universitaire de vaste culture et d'une rare finesse d'esprit, conférencier recherché, homme d'action et polygraphe incomparable, Mgr Maheux mourrait s'il ne pouvait écrire ou dicter à son secrétaire. Que de brochures, que d'articles de revues et de journaux ne sont-ils pas dus à sa plume intarissable ! Le grave archiviste de l'Université Laval peut même, le cas échéant, se transformer en journaliste de grande classe et en redoutable polémiste. Il aime beaucoup d'ailleurs écrire dans les journaux et dans les revues tant de langue française que de langue anglaise. Ce boursier Guggenheim déborde toujours d'activité intellectuelle.

Propos sur l'éducation (1941), *Ton Histoire est une épopée*, *Nos Débuts sous le régime anglais* (1941), *French Canada and Britain* (1942), *Pourquoi sommes-nous divisés ?* (1943), *What Keeps Us Apart?* (1944), *Problems of Canadian Unity* (1944) ; tous ces ouvrages, et je cite seulement les plus récents, sont bien connus. Mgr Maheux conserve aussi dans ses cartons quatre manuscrits prêts à l'impression : *Histoire de la compagnie Price*, *Histoire de l'enseignement des sciences à Québec*, *Histoire de l'Université*

Laval, et *Le Docteur Jacques Labrie*. Ils paraîtront en librairie, je crois, au cours des deux prochaines années.

M. le Président, j'ai le très vif plaisir de vous présenter Mgr Arthur Maheux pour la Médaille Tyrrell.

MAURICE LEBEL

HENRY MARSHALL TORY MEDAL

Henry George Thode

MR. PRESIDENT:

I have the honour to present to you for the Henry Marshall Tory Medal Henry George Thode, Vice-President of McMaster University and one of Canada's most distinguished scientists.

Harry Thode was born at Dundurn, Saskatchewan, not far from where we are meeting tonight. He has never lost his love for his native province and its boundless prairie lands. After obtaining his B.Sc. and M.Sc. at the University of Saskatchewan, Harry Thode went to the University of Chicago where, under the direction of Professor Freed, he obtained his Ph.D. for his work on magnetic susceptibilities.

After a brief teaching period at Pittsburgh, Dr. Thode joined Professor Urey's group at Columbia. It was there that he became interested in isotope separation and laid the foundation for his extensive work in this field.

In 1939 Dr. Thode joined the staff of McMaster University. His outstanding ability and boundless energy led to accelerated promotion; associate professor 1942, full professor 1944, Director of Research 1947, Principal of Hamilton College 1948, and Vice-President of the University in 1958. While this may seem an impressive record it cannot fully convey the real significance of Dr. Thode's contribution to McMaster. His infectious enthusiasm and his unlimited generosity in helping other scientists, combined with his insistence that research should be a vital part of every university professor's responsibility, have been largely responsible for the excellence of McMaster's growing science departments.

When, during the war, the National Research Council became involved in the Atomic Energy Project, Thode was asked to develop the mass spectrometers required for deuterium analysis. His first 180° instrument, already in production at that time and still in operation, was the forerunner of a large number of mass spectrometers of various designs constructed by his students at McMaster and by his graduates in many parts of Canada, the United States, and Europe. In the hands of Dr. Thode and the chemists and physicists he has trained, measurements of isotopic abundances have been used to shed light on many difficult problems of chemistry, geology, and physics. These include the mechanism of bond formation in organic molecules, photosynthesis, the sulphur cycle, geologic age determinations, variations in

isotopic abundances in nature, neutron capture cross-sections, and the fission process. His investigations are described in some eighty research papers and in books and annual reviews.

With the development of nuclear reactors and the consequent availability of many types of radioactive isotopes, Dr. Thode was one of the first to urge that Canada should begin using these isotopes for medical research. As a result of his efforts, some of the pioneer Canadian work on the diagnosis and treatment of thyroid disorders with radioactive iodine was carried out in the laboratory of the Hamilton Medical Research Institute. Today, while McMaster has no medical school, it does have an active Medical Research Department and supervises a large iodine treatment centre at St. Joseph's Hospital.

Dr. Thode has been the recipient of many honours. He was elected a Fellow of this Society in 1943 and has since served as President of Section III and is at present Vice-President of the Society. In 1946 in recognition of his contributions to the war effort he was honoured by being made a Member of the British Empire. In 1954 he was elected a Fellow of the Royal Society of London; in 1955 he received an honorary D.Sc. degree from the University of Toronto; in 1957 he was awarded the medal of the Chemical Institute of Canada and in 1958 he was granted an honorary LL.D. by his Alma Mater, the University of Saskatchewan.

During the last two years, much of Dr. Thode's enthusiasm and energy have been directed towards the construction of the McMaster Research Reactor, the first university reactor to be built in the British Empire. Not only has he been responsible for obtaining the necessary funds, but he has personally been concerned with many of the details of its construction. This new instrument will enable him to integrate many of the active research programmes which he has initiated and directed. He will now be able to demonstrate in a convincing manner one of his deep-felt convictions: that the artificial lines which have been drawn between physics and chemistry should be less clearly defined and that students in these fields of knowledge could more appropriately have only one designation—physical scientists.

Mr. President, in recognition of the many and varied contributions which Dr. Thode has made to science, I am happy to present him to you for the Henry Marshall Tory Medal.

G. M. SHRUM

WILLET G. MILLER MEDAL

Loris Shano Russell

MR. PRESIDENT:

I am pleased to present as recipient of the Willet G. Miller Medal, Dr. Loris Shano Russell, President of Section IV.

Dr. Russell was born in Brooklyn, New York, but came to Alberta when four years old. He attended public and high schools in Calgary, and, on graduation from the University of Alberta in 1927, he won the gold medal for the highest standing in his class. He was awarded an M.A. in 1929 and a Ph.D. in 1930 by Princeton University.

Dr. Russell chose vertebrate palaeontology as his field of specialization, and he has achieved an outstanding success in this and related geological and other disciplines. An examination of his extensive bibliography shows that his interests are not restricted for he has studied rocks far older and fossils far more primitive than those normally considered appropriate to his principal specialty.

His field work and laboratory investigations have been done while holding appointments in the Research Council of Alberta, the Geological Survey of Canada, the University of Toronto, and the Royal Ontario Museum. In 1950, he joined the staff of the National Museum of Canada and was appointed its Director in 1956.

During the Second World War, he held a commission in the Canadian army and devoted much energy to the improvement of electronic communications, a field in which, as a ham of long standing, he is thoroughly qualified.

Mr. President, I am proud to present Dr. Russell, versatile and outstanding scientist, teacher, and administrator, in order that you may confer on him the Willet G. Miller Medal.

F. F. OSBORNE

REPORTS OF SECTIONS

Rapport de la Section I

La Section I a tenu cinq réunions auxquelles ont assisté douze sociétaires : MM. Louis-Philippe Audet, Harry Bernard, Benoît Brouillette, Pierre Daviault, Leopold Lamontagne, Maurice Lebel, Léon Lortie, Mgr Arthur Maheux, Gérard Parizeau, T.R. Père Louis-Marie Régis, o.p., Jean-Paul Vinay et Guy Sylvestre.

La première séance fut consacrée à la discussion des affaires courantes; au cours des autres réunions, on a pris connaissance de dix travaux préparés par les confrères présents à l'assemblée annuelle ou par d'autres confrères qui avaient adressé le texte de leur étude. Nous avons participé au colloque qui groupait toutes les sections, colloque dont le sujet était l'Evolution. Outre les membres de la Section, plusieurs invités ont assisté à quelques-unes de nos séances.

Nous avons eu à déplorer la perte, cette année, de trois de nos sociétaires : MM. Jean Chauvin, Arthur Beauchesne et Arthur Saint-Pierre. D'autre part, nous avons accueilli six nouveaux membres : MM. Marcel Dubé, André Giroux, Léopold Lamontagne, Gérard Parizeau, Yves Thériault et Arthur Tremblay.

Le rapport du Conseil fut approuvé.

Les élections ont donné les résultats suivants :

Président : Léon Lortie
Vice-président : Antoine Roy
Secrétaire : Louis-Philippe Audet
Représentant supplémentaire au Conseil : Jean-Marie Gauvreau
Comité général de nominations : Léon Lortie, Antoine Roy
Comité de la Médaille Chauveau : M. le Président général, Léon Lortie, Jean-Charles Bonenfant, Maurice Lebel, Robert Elie
Comité de la Médaille Lorne Pierce : Guy Sylvestre, Robert Elie, Maurice Lebel
Comité de la Médaille Tyrrell : Jean-Charles Bonenfant, Antoine Roy, Mgr Olivier Maurault
Comité des candidatures : Léon Lortie, Maurice Lebel, Jean-Charles Bonenfant, Guy Sylvestre, T.R. Père Louis-Marie Régis, o.p., Jean-Marie Gauvreau, Dr Adrien Plouffe, Louis-Philippe Audet
Comité des bourses : Maurice Lebel, Frère Clément Lockquell, c.c., T.R. Père Louis-Marie Régis, o.p., Louis-Philippe Audet, Pierre Daviault
Comité du programme (section) : Léon Lortie, Léopold Lamontagne, Louis-Philippe Audet

Comité du programme (général) : LÉON LORTIE, LOUIS-PHILIPPE AUDET
Comité des projets (planning) : LÉON LORTIE
Comité des publications : JEAN-PAUL VINAY, LOUIS-PHILIPPE AUDET
Editeur : LOUIS-PHILIPPE AUDET

Il est proposé par Louis-Philippe Audet, appuyé par Maurice Lebel, que le rapport de la Section I soit adopté.

REPORT OF SECTION II

Section II held two business meetings, three general sessions, and participated in the general symposium on Evolution. Thirty-six fellows attended and a number of visitors were present. Four of the six newly elected fellows were welcomed.

The following officers were elected:

President: REV. G. B. PHELAN
Vice-president: F. R. SCOTT
Secretary: GEORGE F. G. STANLEY
Additional Member of Council: C. P. STACEY
General Nominating Committee: F. A. KNOX, G. F. G. STANLEY
Advisory Committee (New Fellows): F. R. SCOTT (*Chairman*), G. E. WILSON, F. E. L. PRIESTLEY, G. E. BRITNELL, W. J. ROSE, G. F. G. STANLEY, G. B. PHELAN
Medal Committees: *Lorne Pierce Medal*: REV. G. B. PHELAN, F. R. SCOTT, H. N. FRYE
Tyrrell Medal: REV. G. B. PHELAN, F. R. SCOTT, D. G. CREIGHTON
Programme Committee: C. P. STACEY (*Chairman*), M. M. ROSS, A. H. JOHNSON, G. E. BRITNELL, REV. G. B. PHELAN, G. F. G. STANLEY
Editorial Committee: C. P. STACEY, M. M. ROSS, A. H. JOHNSON, G. E. BRITNELL, G. F. G. STANLEY

The Report of Council was approved.

The members of the Section noted with deep regret the deaths of R. MacG. Dawson, Hon. S. E. Smith, and W. E. McNeill.

The transfer of W. O. Raymond to the retired list was noted.

It was moved by G. F. G. Stanley, seconded by V. W. Bladen, that this report be adopted.

REPORT OF SECTION III

Section III has held two business meetings and seven scientific sessions, up to the present.

Forty-eight Fellows attended the annual meeting.

The Presidential Address, the invited papers by Dean Porter of this University and Dr. Post of the University of California were stimulating, informative, and very well attended.

The Section accepted the report of Council.

The Section suggested that the present plan of awarding the Rutherford Memorial Fellowships be continued but that the award be increased to $750 each.

The following officers were elected:

President: G. DE B. ROBINSON
Vice-president: HELEN S. HOGG
Secretary: R. L. MCINTOSH
Additional Member of Council: G. M. SHRUM
Editorial Committee: G. M. SHRUM, T. THORVALDSON, G. DE B. ROBINSON
Members of the General Nominating Committee: G. M. SHRUM, G. DE B. ROBINSON
Rutherford Memorial Scholarship Committee: B. W. CURRIE, HELEN S. HOGG, P. A. GIGUÈRE, D. C. ROSE
Advisory Committee (New Fellows): G. HERZBERG (*Chairman*), G. DE B. ROBINSON, HELEN S. HOGG, R. L. MCINTOSH, K. J. MCCALLUM, G. M. VOLKOFF
Programme Committee: Officers of the section, with power to add
Representatives on the Canadian Journals of Research: H. E. DUCKWORTH, D. J. LEROY
Representatives on the Canadian National Committee of the International Astronomical Union: B. W. CURRIE, HELEN S. HOGG, G. HERZBERG
Representatives on the Committee on Oceanography: H. B. HACHEY, G. S. FIELD, G. M. SHRUM
Representative on the C.I.C. Medal Committee: LÉO MARION
Representative on the Canadian National Committee of the International Union of Pure and Applied Chemistry: R. L. MCINTOSH
Representative on the Canadian National Committee of the International Union of Pure and Applied Physics: R. E. BELL

The Section wishes to express its appreciation and thanks to the local committee, and in particular to Dr. Haslam, for the arrangements for its meetings and especially for their gracious entertainment of the Fellows and their ladies.

REPORT OF SECTION IV

Section IV held sessions on evolution, on geophysics and geochemistry, on general geology, including important papers on the geology of parts of Saskatchewan, and a business session.

The Section noted with deep regret the deaths during the past year of three of its Fellows, Manley B. Baker, Charles Camsell, and G. Vibert Douglas.

The following officers and representatives were elected by the Section for 1959–60:

President: F. F. Osborne
Vice-president: J. E. Gill
Secretary: S. C. Robinson
Additional Member of Council: L. S. Russell
Editorial Committee: H. S. Armstrong and Fellows resident in the Hamilton-Toronto area
General Nominating Committee: G. S. Hume, G. S. MacKenzie
Advisory Committee (New Fellows): R. T. D. Wickenden (*Chairman*), B. T. Denis, J. C. Sproule, J. W. Ambrose, J. A. Jacobs, A. R. Byers, S. C. Robinson (*Secretary*)
Willet G. Miller Medal Committee: V. J. Okulitch (*Chairman*), B. T. Denis, T. H. Clark, R. E. Folinsbee, A. W. Joliffe
Programme Committee: J. E. Hawley (*Chairman*), A. W. Joliffe, R. F. Legget
Committee on Oceanography: W. H. Mathews, G. S. MacKenzie, W. W. Moorhouse

The Report of Council was approved.

The post-war years have seen major applications of the more exact sciences, physics and chemistry in particular, to the problems of geology. This has been reflected by a marked increase in the number of geophysicists and geochemists elected by Section IV. At the same time, leading scientists of the growing disciplines of geography and soil mechanics have been recognized by election to the Section. This diversification of our Fellowship has coincided with a very large increase in the number of geologists in Canada. In the past two years, of the eight new Fellows elected to Section IV only three were geologists. In consideration of these facts, the Section has gone on record to the effect that the minimum number of new Fellows which would meet our requirements is five.

As was reported to the Society a year ago, a committee of Section IV was elected to study the work done in geology by Federal and Provincial agencies. This committee, jointly with a committee of the Geological Association of Canada, presented a brief to the Prime Minister on October 21, 1958, requesting that the activities and staff of the Geological Survey of Canada be increased in keeping with the great expansion in Canada's mineral industry. The brief was cordially received and it may be significant that, in the report of the Parliamentary Committee on Mines, Waters, and Forests, tabled in the House of Commons a short time ago, the recommendations dealing with the Geological Survey of Canada correspond most closely with

those contained in the brief. It was proposed that a modified version of the brief be presented to the Conference of Ministers of Mines this summer.

Report of Section V

The following officers and committee members were elected for the 1959–60 session:

President: Dr. G. Krotkov
Vice-president: Dr. D. L. Thomson
Secretary: Mr. James Gibbard
Additional Member of Council: Dr. N. H. Grace
Editorial Committee: Dr. E. Horne Craigie (*Chairman*), Dr. R. D. Gibbs, Dr. A. Frappier
General Nominating Committee: Dr. W. P. Thompson, Dr. T. W. M. Cameron
Medal Committee, Flavelle Medal: to retire in 1960, Dr. A. G. McCalla (*Chairman*), Dr. C. P. Leblond, Dr. A. G. Lochhead; to retire in 1961, Dr. K. C. Fisher, Dr. E. Pagé, Dr. E. C. Black
Advisory Committee (New Fellows): to retire in 1960, Dr. H. A. Senn (*Chairman*), Dr. M. J. Dunbar; to retire in 1961, Dr. G. A. Ledingham, Dr. J. A. Dauphinee; to retire in 1962, Dr. J. G. Rempel, Dr. R. G. E. Murray, Mr. J. Gibbard (*Secretary*)
Committee on Oceanography: Dr. A. G. Huntsman, Dr. I. McT. Cowan, Dr. W. A. Clemens, Dr. F. R. Hayes,* Dr. M. J. Dunbar*
Scholarship Committee: as in 1958
Programme Committee: Dr. J. H. Orr (*Chairman*), Dr. A. C. Burton, Dr. R. G. E. Murray
Representatives on Editorial Board, Canadian Journal of Research: Dr. D. L. Bailey, Dr. T. W. M. Cameron

The Section held five meetings at which thirty-three papers were presented and attendance at these sessions varied from fifty to one hundred Fellows and guests. These papers included the Presidential Address by Dr. N. H. Grace and the Flavelle Medal Address by Dr. Murray L. Barr. The Section held a special symposium on Evolution, thus marking the one hundredth anniversary of the publication of Darwin's *Origin of Species*.

Section V held two business meetings, approved the Report of Council, welcomed five new Fellows, and stood for a few moments of silence in respect for its deceased Fellows Dr. K. W. Neatby, Dr. Arthur Gibson, Professor W. V. Cone, Dr. Pierre Masson, and Dr. R. B. Miller (posthumously elected at this meeting).

The Section noted the request of Dr. D. A. Scott to be transferred to the list of retired Fellows.

The Section also discussed the formation of an International Panel of Biogeography of the North Atlantic which will be especially concerned with the preparation of biological maps. Many valuable data are available in various countries and, under the auspices of the National Academy of Sciences in Washington, a real effort will be made to collect these data for publication. It should be noted that the consensus of opinion of the members of the Section was that the Panel of Biogeography of the North Atlantic should be given whole-hearted support. It may, therefore, be desirable for the Committee on Oceanography to strengthen its membership in the Biological Sciences and in this connection it is recommended by Section V that Dr. F. R. Hayes and Dr. M. J. Dunbar be considered as additional members if it appears to Council that such action is required.*

*At a subsequent meeting of Council held in Saskatoon it was agreed that the recommendation in respect to Drs. Hayes and Dunbar be accepted and their names have therefore been added to the members of the Committee.

APPENDIX A

DISCOURS PRÉSIDENTIEL
PRESIDENTIAL ADDRESS

PROCEEDINGS OF THE ROYAL SOCIETY OF CANADA

VOLUME LIII : SERIES III : JUNE, 1959

DISCOURS PRESIDENTIEL PRESIDENTIAL ADDRESS

The Evolution of the English and French Languages in Canada

PIERRE DAVIAULT

IT was not without some misgiving that I used the word "evolution" in the title of my address, even though in so doing I was bringing the speech into harmony with the theme of this meeting of the Royal Society of Canada. The evolution about which I am going to speak is very different from that dealt with in the learned papers which take up, at least in part, the meetings of our sections. I am fully aware that the reflections I am about to present on purely intellectual matters may appear frivolous to minds accustomed to gathering and thinking about concrete facts.

Il suffit d'un peu de réflexion et d'une connaissance bien sommaire des méthodes de la linguistique pour comprendre que cette science s'appuie comme les autres sur la recherche et l'observation exacte, même si elle n'a recours ni à l'éprouvette ni au microscope.

Le mot *évolution* a été appliqué au langage vers le temps où les doctrines évolutionnistes prenaient de la vogue dans le domaine des sciences naturelles, bien que les linguistes aient souvent préféré parler de la vie et de la mort des mots, expression moins exacte car il y a bien autre chose que l'apparition ou la disparition de mots dans la formation ou la transformation d'une langue.

La linguistique actuelle repose en grande partie sur la notion d'évolution, évolution à l'intérieur d'une même langue, évolution et transmission des caractères acquis d'une langue à l'autre, adaptation de ces caractères aux exigences du milieu.

Linguistics may appear to be an exact science for the same reason as the natural sciences are. It carries the analogy to the point of possessing the same characteristics of uncertainty. Just as the natural sciences have not been able to explain the origin of life, so linguistic science no longer even attempts to guess the origin of language. This is rather a pity, because the quest for its origins at least gave cause for amusement. For example, it gave rise to the theory of imitative origin, or the *bow-wow* theory. This theory was so called because it assumed that primitive words had an imitative value recalling, for instance, the barking of the dog to designate the animal itself or the act of barking. Then there was the *pooh-pooh* theory, which stressed the language of exclamations. Still another was the theory of harmony between

sounds and sensations; this was called the *ding-dong* theory. It is not even known whether language has had several diverse origins. Like the natural sciences, linguistic science has its "missing links" and it is obliged to imagine the necessary links which have never been found in the logical succession of languages. In the field of linguistics the experts have also spoken, mistakenly, of the "survival of the fittest," which is sheer nonsense, and, conversely, of the disappearance of languages which could not withstand the advance of stronger rivals.

Finally the danger of adopting the vocabulary or the methods of natural science came to be understood because language is a human phenomenon in which the human intellect and the human will play a part. Gone are the days, around 1869, when Schleicher could work out a theory of the life of language on Darwinian principles without provoking a smile. It is absurd, for instance, to talk about necessity in linguistics: there is no necessity which compels people in England to call "petrol" what we in America call "gasoline."

However important these considerations may be, it is not my intention this evening to examine such broad questions. Having established the connection between the title of my address and the general theme of this gathering, I now come to the heart of my subject—the evolution or, if you prefer, the transformation—of the two official languages of Canada. Let me say in passing that I have not the slightest intention of even touching on the legal problem that would be raised by the use of the expression "two official languages of Canada." Despite the cavilling of jurists or ill-disposed persons, we take it for granted that, as a result of the historical circumstances attending the formation of the Canadian people (I do not think we can speak of a Canadian "nation" yet), we in Canada possess the languages of two great cultures. This fact is now accepted, with good or bad grace, by every serious-minded person; it is denied only by some who have not yet emerged from the dark recesses of Canada's prehistoric era.

La coexistence des deux langues de culture au Canada, qu'on le veuille ou non, conditionne dans une large mesure ce qu'on peut appeler notre vie nationale. Elle donne, à la vie canadienne, son ton particulier, l'élément de différenciation qui en fait une entité à part dans le vaste monde où nous vivons. Qu'il s'agisse chez nous de la vie politique ou de la vie culturelle, de la vie administrative ou de la vie la plus quotidienne, le caractère bilingue de notre population infléchit la structure du mode de vie dans un certain sens. Et il faut en tenir compte, si l'on tient à envisager le Canada comme un tout, et non pas comme une simple collection d'unités disparates n'ayant entre elles que les liens les plus lâches.

One of the reasons why some Canadians fail to recognize the full importance of this bilingualism is that they are ignorant of, or misunderstand, one essential fact, namely that the languages spoken in Canada are new varieties of English and French. The characteristics of these varieties give rise to strange judgments on the language of one group or the other, because

these judgments are always made with reference to the language of origin. In the past such judgments all came from one side and to a large extent they still do. To put it more explicitly, what I mean is this: on the one hand the judgments pronounced on the English and French spoken in Canada were distinctly unfavourable; on the other hand those adverse judgments were mostly directed at the language of the French Canadians. People spoke of the French-Canadian "patois" as opposed to "Parisian French," which, on the one hand, infuriated us and on the other, convulsed us with laughter. The reason for this is that in the first place there can be no question of a patois in Canada, since the age of patois, that is, of local unwritten dialects (which is the real meaning of the word "patois"), is long since past, and in the second place it was especially in Toronto, where this talk of "Parisian French" was heard, that certain business firms had the audacity to print, for the benefit of their French-Canadian customers, an absolutely incomprehensible High School French. Fortunately, their number is steadily diminishing. The expression has remained and for us the term "Parisian French" means the kind of "pidgin" French which sometimes comes out of Toronto or elsewhere. But the legend of a French-Canadian patois has had more harmful effects: being vouched for, we are assured, by professors from France who were afraid of losing their jobs, this legend was long the reason why French Canadians were barred from professional posts in English Canadian universities. This prejudice is dying out and we now see French-Canadian professors in many universities or colleges in English Canada and even more so in the United States. The legend persists, however, and I could name one English-Canadian university where the teaching of French is actually entrusted to foreign instructors, neither French nor English in origin, in horror of French Canadians.

For their part, French Canadians did not express so many derogatory opinions about the English spoken in Canada, mainly because they were not sufficiently familiar with the English. But those who are beginning to learn it realize now that peculiarities appear in Canadian English to an even more pronounced degree than in French-Canadian French. When we look more closely into the matter, the fact becomes apparent that there is a much greater difference between the English spoken in Canada and that spoken in England than there is between Canadian French and the French used in France. One of the reasons for this is, as we shall see, that Canadian English is not so much a variety of the King's English as it is a variety of the English spoken in the United States. For example, whereas the written French of Canada is in no way different from that of France, the written English of Canada differs to a certain extent from the English of England in several ways. I shall give only one proof in support of this statement. A few months ago a group of language experts wanted to find out which system of English spelling was followed in the various provinces of Canada, particularly for words like "honor" or "honour," theatre, centre, etc. Most of the educators who were consulted admitted that, although they do not follow Webster

blindly, they do not entirely accept the spelling of the Oxford Dictionary either. Canadian usage would have to be situated, they concluded, not half-way between Webster and Oxford, but closer to Webster.

As for spoken English, two incidents will suffice to illustrate what I mean. A young friend of mine who is a French-speaking Rhodes scholar returned from Oxford, bringing with him a beautiful bride whom he had married in London. This agreeable person declared to me some time afterwards that she preferred to speak French in the stores in Ottawa because the clerks could hardly understand her London English. The other incident occurred when the simultaneous interpretation service was introduced in the House of Commons. Only one criticism was raised, and it was not even a criticism, but rather a note of astonishment. It was that one of the English-language interpreters had a "British accent." Did not a Toronto television station quickly dismiss an actor who also had a British accent? And I would point out that our colleague, Vinay, a distinguished expert on the English language, said on his arrival from Europe that he was less confused by the French than by the English spoken in Montreal.

Naturally, the judgments passed either on the English of Canada or on Canadian French are unfavourable. The reason is, as I have noted, that people always compare these two languages to the languages from which they are derived and condemn them to the extent that they deviate from the original languages. The assumption is that any innovation in, hence any evolution of, the languages is to be condemned.

Il y a là, du reste, une question fort complexe, que je n'ai pas l'intention d'examiner ici. Disons seulement, en passant, qu'il y a des innovations linguistiques admissibles et d'autres qui ne le sont pas. Ce qu'il faut retenir, c'est que, justement, on ne comprend pas généralement que les langues doivent évoluer, surtout les langues placées dans les circonstances où se trouvent les nôtres.

Cette incompréhension est d'ailleurs assez curieuse, quand on s'arrête à y penser. Le langage est le fait de pensée et le fait social qui se situent à l'échelon le plus élevé de l'ordre des valeurs. C'est pourtant le fait qu'on ignore le plus en général, mais aussi qu'on croit connaître le mieux. On se dit : je parle, donc je connais le langage. Raisonnement faux. Tout le monde respire, tout le monde a une circulation sanguine. Pourtant, combien connaissent vraiment les mécanismes de la respiration ou de la circulation? Mais il faut dire que l'ignorance de ces mécanismes ne crée pas de passion, comme l'ignorance des faits de langue.

C'est que la langue n'est pas seulement moyen de communication. Elle entraîne tout le système de penser et de sentir. Nous le savons bien chez nous. Un Canadien français qui s'anglicise cesse d'être canadien-français, non seulement pour ce qui est de la langue, mais aussi pour ce qui est des traditions, des coutumes, de la façon d'envisager la vie. Le contraire se produit. On rencontre, surtout dans le Québec, des gens au nom bien anglais qui n'ont plus d'anglais, précisément, que le nom et qui sont même nationalistes à outrance comme on peut l'être dans Quebec.

Pour apprécier intelligemment l'anglais et le français du Canada, il faut bien réfléchir aux circonstances qui ont fait de ces langues ce qu'elles sont, c'est-à-dire à leur évolution. Après de nombreux détours, nous y voici, enfin.

The predominant fact to note here is that the English and the French of Canada are the result of migrations. For that matter, apart from the native tongues, all the languages in America, whether English, French, Spanish, or Portuguese, are transplanted languages. Emigration is the ideal condition for the evolution of languages, emigration on a massive scale.

According to one hypothesis which is almost a certainty, the inflectional group of languages to which French and English belong trace their origins back to a common ancestor, Indo-European. No vestiges remain today of the original Indo-European, but the language has been reconstructed by deductive reasoning. It is believed that the Indo-Europeans originally lived on the shores of the Baltic, from where some groups emigrated at various times in all directions while others remained where they were. They carried their language with them. Therefore, if we accept the theory that they all spoke the same language originally, it must be agreed that the language became diversified through migration, through the loss of contact between groups, and through innovations made by some of them which did not reach the others. In this way, it is believed, the vast differences came about which exist today between Hindustani and Welsh, and between Russian and French, so that it now seems strange that the present languages, both of India and of western Europe, should come from a single source.

The languages of America, English and French in particular, have undergone the same process of immigration. However, it should be emphasized at once that these migrations took place under circumstances quite different from those of prehistoric times; therefore it should not be thought that our languages will necessarily undergo the same differentiations as Indo-European did. That is why, for example, it was possible to make the following judgment: "Although he chose to ignore the fact, Mencken could not hide from his readers the reality that what he called the American Language was, when all is said, a mere variety of the English language."

Les différences dans les circonstances tiennent surtout à ce que la migration de nos aïeux s'est produite à une époque où les moyens de communication étaient déjà de telle sorte qu'il n'y a jamais eu perte de contact entre les émigrés et les groupes restés dans la métropole. Les communications pouvaient être lentes, d'après nos normes actuelles, elles n'en étaient pas moins constantes. Autre différence essentielle, c'est que nos migrations se sont produites après l'invention de l'imprimerie. Or, l'imprimerie a mis fin à une ère linguistique, c'est-à-dire celle de la transmission de la langue uniquement par voie orale. L'imprimé exerce son influence sur la parole au point, d'abord, d'interdire la formation de patois, ensuite d'empêcher une transformation trop rapide de la langue : l'imprimé fige la langue dans une large mesure.

Having said that—and it needed saying—we should recognize the fact that the effects of emigration on our languages were the same as they have

always been in the realm of language, although to a much lesser degree. In 1607 John Smith transported to Virginia the language of Shakespeare's and Milton's era. One year later, Champlain brought to Quebec the language of Malherbe's time. Notice that I did not say that Smith brought with him the language of Shakespeare nor that Champlain transported the language of Malherbe. The settlers were humble folk. They knew nothing of the great literary works of their time and they spoke the language of the ordinary people.

Time passed quickly and the new settlers gradually began to give new meanings to the terms they had brought with them across the Atlantic to designate conditions of life that were very different and to name a new fauna and flora. In this last case in particular they frequently had recourse to the native languages with which they came in contact. The number of innovations grew and grew. In the old countries, too, the languages continued to evolve, because a living language is never static. The innovations on both sides were communicated from one to the other, but only in part. Where the circumstances which had given rise to certain innovations on one side of the ocean did not exist on the other side, the tendency was not to communicate such innovations. The people living on the other side of the ocean did not feel any need to adopt them, so they appeared only as curiosities that were quickly forgotten. The divergences became accentuated because usage was no longer the same.

After a time people become conscious of them on both sides. Note that the users of a language in the process of transformation, especially a language that has migrated, take a long time to notice that the language has changed. To take an example, it was not until the ninth century that it was noticed that Latin was becoming a new language in France. Moreover, this new language was confined to the common people. Six or seven centuries more were needed before this new tongue was dignified with the name of a language.

In the languages of those who emigrated to America, people began to notice the innovations. Some reflections on the language of the colonies began to appear in print in London. In 1735, one Francis Moore, in a description of Savannah, wrote: "The bank of the River (which they in barbarous English call a *bluff*) is steep." A short time later, Samuel Johnson, speaking of the *American dialect*, called it "a tract of corruption to which every language widely diffused must always be exposed." The same was true of the speech of French Canadians, which was disparaged chiefly for its pronunciation.

People on the other side of the Atlantic were amazed at these transformations and attributed them to the intellectual inferiority of the emigrants. They did not stop to think that their own languages were themselves transformations, if not deformations, of earlier idioms.

I have mentioned French-Canadian pronunciation, which differs from that of Frenchmen today. The same could be said of the pronunciation of

English in America compared to that of English in England. Pronunciation is the most immediately observable characteristic of a language. It is by his accent, first and foremost, that a North American—French-speaking or English-speaking—is distinguished from a European. It is one of the laws of evolution of an emigrant language that pronunciation, which continues to evolve normally in the mother country, tends to become static and archaic in the new country. Because of its isolation, the colony tends to preserve the language that was in use at the time of its founding. The French Canadian's pronunciation is much closer than that of a modern Frenchman to the pronunciation of the seventeenth century; and the pronunciation of the English Canadian is much closer than that of the Englishman to Elizabethan habits of speech. It has been observed in the United States that archaism is most pronounced in regions like the Appalachians or the Ozarks, where the people are isolated from the main body of the population and where they have hardly been touched by innovations. This is a rule that has been observed for a long time. Among the Romance languages, those of the regions farthest from Rome, such as Portuguese and Roumanian, are closer to the older forms of Latin, whereas in France and Spain the language was more directly affected by innovations, especially of popular origin.

Archaism is also noticeable in the vocabulary. It might be surprising to find that the language of very progressive countries such as those in America retain so many expressions or constructions long since forgotten in Europe. We cease to be astonished when we remember once again that the language continues to evolve in the mother country and that its innovations reach the colonies only after some delay. (I use the word "colony" in its cultural, rather than its political, sense.) This rule has applied to the French of Canada perhaps more than to the English of America. Indeed, we escaped the great linguistic upheaval which resulted from the French Revolution as it does from every revolution. However, the other languages of America did not escape this rule.

On the other hand, side by side with this archaism, a language that has emigrated is also characterized by neologism. If such a language evolves in the mother country, it also evolves in the new country, and in a very different way. The innovations that are made in a new country are due to the necessity of designating new phenomena in every sphere. This applies, for example, to politics and geography and to flora and fauna. The effect on a language of contact with new languages must also be taken into account, even if such languages are only native dialects. But the chief cause of innovations, in the colonies as in the homeland, is the natural instinct of every human group constantly to change, in its details, its means of expression. Words wear out quickly, first because they cease to give accurate expression to modes of thought or feeling which are constantly changing, and, in the second place, because their evocative power becomes dulled by too long familiarity.

But very few new words (and this includes slang) pass back and forth between widely separated groups, because the circumstances which give rise to them are very local. These days, however, the widespread use of the means of communication and the dissemination of what is called, sometimes disdainfully, mass culture, facilitate the passage of new words and expressions from one group to another. As a result, the differences between the varieties of a language tend to become less pronounced. In any case there is a tendency for the process of differentiation to slow down.

Ce n'est pas mon propos, ce soir, d'examiner dans le détail l'évolution de nos parlers en Amérique. J'ai voulu, simplement, donner quelques indications pour faire pressentir que ces langues, et singulièrement l'anglais et le français, ont obéi aux mêmes lois d'évolution, ont passé par les mêmes transformations et ont abouti aux mêmes résultats.

However, as far as English and French are concerned, it must be noted that the process of evolution has deviated in both cases as a result of circumstances peculiar to each language; but if the examination is conducted on a fairly high plane, it will be seen that these circumstances can be reduced to a common denominator. This common denominator, if I may say so, is the position of English and French in Canada as languages of minority groups. This fact is obvious for French Canadians, who are a small island in an Anglo-Saxon sea. It is less apparent for Anglo-Canadians who live in contact with the great American colossus; nevertheless it is true.

Pour le Canadien français, cette situation a des conséquences évidentes, dans le domaine linguistique. L'anglais, qui domine au Canada, exerce une influence très considérable sur notre langue, au point de faire craindre qu'elle ne la transforme de fond en comble et ne finisse par en faire un dialecte bien éloigné du français académique.

As I have already pointed out, English-speaking Canadians, because of their position as a minority in America, speak a variety of American English. This state of affairs stems from both historical and geographical causes. It must be remembered that there was no sizable English population in Canada until after the American Revolution and the immigration of the Loyalists which resulted. The Loyalists brought with them the peculiarities of speech which were already distinguishable in the insurgent colonies. Therefore from the very outset the English of Canada was different from that of England.

This peculiarity has been maintained. In the realm of language, it is owing to the proximity and numerical size of the American nation that American English exerts a much more immediate and considerable influence on the English of Canada than that exerted by the King's English. It does not follow that Canadian English should be merged with American English. The intellectual, sentimental, or political ties that English Canadians maintain with England, our institutions which are so different from American institutions, our own special *milieu*—these factors serve to preserve British influences in this country which are not felt in the United States.

Canadian English shows its special character in another way, too. Being a living language, it has created terms or forms as every dynamic language does. We have an example of this in the term used for the prosecutor; in the United States they say *district attorney*, in England, *public prosecutor*, and in Canada, *crown attorney*. This is only one example; to give an account that would be in any way adequate of the characteristics of Canadian English, or even to catalogue the classes into which they fall, would require a very long speech. I should even point out that Canadian English has borrowed fairly freely from the language of the French Canadians. I have only to mention here the word "prairie." Of course there is this essential difference in the influence of the environment that, whereas Canadian English is subject to the influence of a variety of the same language, French Canadian is influenced by a completely different tongue and the consequences are far more serious.

I have tried to convey the idea that the two great cultural languages of Canada are in the same position. The laws of life, that is, of evolution, have been operating in both languages. Coming in some cases under identical influences, but acted upon by special circumstances, both languages resulted in new varieties of the languages brought over from Europe. Any judgment passed on the one applies with equal force to the other. If we think that the evolution of one should be condemned because it is in reality a corruption, we should likewise condemn the other. But should we condemn the new varieties of French and English which are spoken in Canada? That is a vast question which I cannot deal with at the end of a speech that is already too long.

Qu'il me suffise de dire ici qu'à mon avis une bonne part de la transformation de nos langues, aussi irréversible que la sélection naturelle dans le domaine biologique, était une des conditions de la vie dans un milieu nouveau et que, dans cette mesure, on doit y voir un enrichissement plutôt qu'une corruption. Seulement, il faut, encore une fois, se bien garder de pousser trop loin l'analogie avec les sciences naturelles et ne pas voir de nécessité là où il n'y a que caprice de l'esprit humain. Pour une part, les nouveautés de nos langues, au Canada, sont le produit de l'ignorance, du laisser-aller, de l'irréflexion. Ces nouveautés sont à rejeter.

If we reflect further, we have to admit that it is not only legitimate, but necessary, to compare the Canadian varieties of French and English with the original languages. The latter are marvellous instruments of thought, forged through long centuries and consolidated by an admirable succession of literary, scientific, and historical works. The childish desire to assert our independence should not make us reject standards which are a guarantee of strength. Especially in these times when there is a need for universal media of communication it would be foolish to try to develop new ones. We in Canada have the advantage of possessing two of the finest instruments of human culture; let us not do anything to destroy them.

One of the difficulties is that not only do the new countries—or more

precisely, the countries where the new varieties are spoken—become independent of the mother countries, but they often become wealthier, more populous, and more dynamic. They tend to think of themselves as the promise of the future and of the "old country" as a relic of the past. It should be recognized, however, that the old lands remain the repositories of the traditions and the cultural heritage which are indispensable to us. How can all these conflicting tendencies be reconciled? Portugal and Brazil solved the problem a few years ago when they signed a pact under which Brazil promised to respect and safeguard the language of Camoens, particularly with regard to the grammar, and Portugal agreed to accept certain Brazilian innovations. While we do not have to go that far, it is a fact that we should impose a discipline on ourselves; such self-discipline can in no way be detrimental to the legitimate evolution of our languages.

Finally, let us recognize the fact that there has been evolution on both sides; let us recognize that each of our Canadian languages is as good as the other and in this domain at least let us have that esteem for one another which should lead to mutual understanding.

APPENDIX B

BIOGRAPHICAL SKETCHES OF DECEASED MEMBERS

Arthur Beauchesne

1873–1956

LE 7 avril, 1959, mourait à Ottawa Arthur Beauchesne qui avait été admis à la Société royale du Canada en 1924. Il fut président de la Section I en 1931 et secrétaire de la Société de 1936 à 1940. *Les Mémoires* contiennent sept études de littératures et de science politique qu'il présenta de 1925 à 1935.

Léonidas-Emile-Arthur Beauchesne naquit à Carleton, province de Québec, le 15 juin, 1876. Il était le fils de Caroline Lefebvre de Bellefeuille et de P.-C. Beauchesne, notaire, qui fut député conservateur de Bonaventure à l'Assemblée Legislative de 1874 à 1876, alors que son élection fut annulée pour influence indue par une décision judiciaire, et ensuite à la Chambre des Communes, de 1879 à 1882. Il fit ses études secondaires à l'Université Saint-Joseph de Memrancook, Nouveau-Brunswick, qui lui accorda son baccalauréat ès arts en 1895. Au gré de plusieurs aventures journalistiques, il suivit les cours de droit à l'Université Laval et fut admis au barreau du Québec en 1904.

Pendant la première décennie de sa vie active, il fut tour à tour fonctionnaire et journaliste militant pour le parti conservateur. Il fut secrétaire d'Evariste Leblanc, président de l'Assemblée législative, de 1895 à 1897, secrétaire d'une commission d'enquête sur l'administration de la prison et du palais de justice de Montréal, en 1897 secrétaire d'Adolphe Chapleau, alors lieutenant-gouverneur. Il fut ensuite reporter à la *Gazette*, au *Montreal Star*, à la *Presse*, et rédacteur-en-chef du *Journal* de 1901 à 1903. Il écrivit aussi des articles humoristiques dans le *Nationaliste*, le *Taon*, et l'*Action*. Pendant qu'il était au *Journal*, Beauchesne publia sous la signature « Un conservateur » une attaque contre Mgr Paul Bruchési archevêque de Montréal, dont il admit ensuite crânement la paternité et qui révélait une pointe d'anticléricalisme au sein du parti conservatoir traditionnellement lié au clergé. En 1905, il fonda un hebdomadaire politique, l'*Opinion*. En 1908, aux élections fédérales, et, en 1912, aux élections provinciales, il fut successivement candidat malheureux dans son comté natal de Bonaventure.

En 1913, il est attaché au Ministère de la Justice en qualité de conseiller juridique. En 1916, il devient assistant greffier de la Chambre des Communes et, en 1925, greffier, poste qu'il remplit avec la plus grande compétence jusqu'au moment de sa retraite, en 1949. Il fut en procédure parlementaire le conseiller des hommes politiques de tous les partis et il inspira les décisions des orateurs de la Chambre des Communes. Il se tailla même dans tous les parlements britanniques une enviable réputation et son nom fut cité au côté de May, Campion et Bourinot. A deux reprises au moins, à l'occasion de sa retraite et lors de sa mort, Arthur Beauchesne reçut les hommages unanimes de la Chambre des Communes. Le 15 septembre, 1949, le très honorable Louis-S. St.-Laurent, premier ministre du Canada,

appuyé par le chef de l'Opposition M. George A. Drew, proposait « que, en reconnaissance des longs et fidèles services de M. Arthur Beauchesne . . . on lui décerne le titre de fonctionnaire honoraire de cette Chambre » . Le 7 avril, 1959, le très honorable J. G. Diefenbaker, premier ministre du Canada, en même temps que l'honorable L. G. Pearson, chef de l'Opposition, et M. Hazen Argue, rendait hommage à la mémoire de M. Beauchesne en affirmant que « par sa personne et au moyen de son ouvrage sur les règles et la procédure parlementaires, il a donné au parlement une distinction toute particulière » .

Après sa retraite, il manifesta encore une grande activité. Il fut conseiller du gouvernement de la province de Québec en matière constitutionnelle de 1950 à 1952 et il fut de nouveau candidat malheureux dans le comté d'Ottawa-Est aux élections fédérales de 1953. Il fit partie de plusieurs sociétés et reçut de nombreuses décorations.

Sans prétendre dresser une bibliographie complète de ses œuvres, nous croyons devoir rappeler les titres de la plus grande partie de ses écrits. Ses études présentées à la Société royale portèrent sur les sujets suivants : *Napoléon journaliste* (1925) ; *Edmond et Jules Goncourt* (1926) ; *Barbey d'Aurevilly* (1927) ; *Stendhal* (1928) ; *Gustave Flaubert* (1929) ; *La Grande Bretagne et ses dominions* (1931) ; *Le Martyre de père Rasle* (1935).

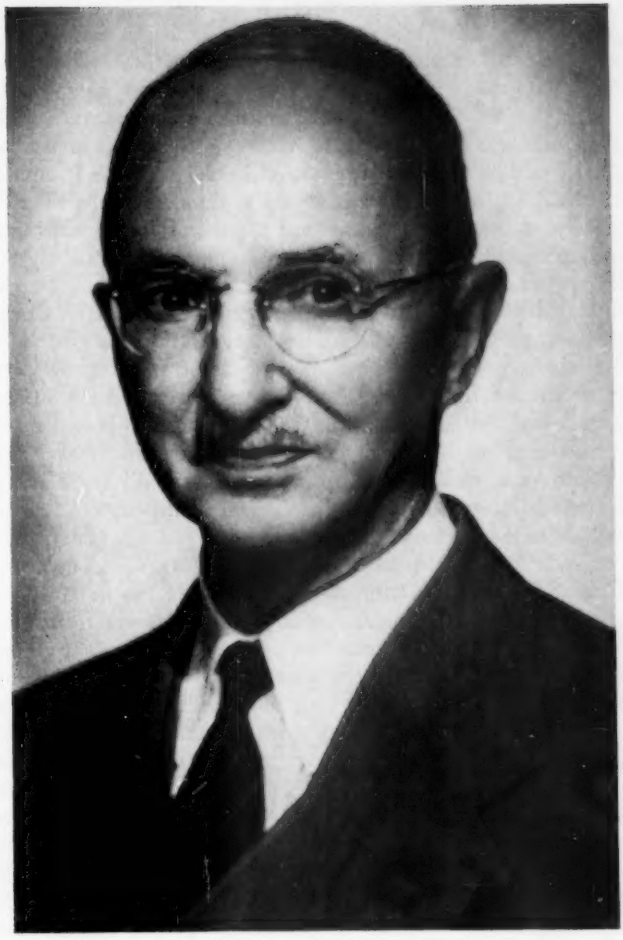
Cinq de ces études auxquelles il en ajouta une sur Talleyrand formèrent, en 1930, un recueil intitulé « Ecrivains d'autrefois » qui, souligne une biographie que l'auteur a sans doute relue, fut un « livre bien accueilli » par la *Revue des Deux-Mondes*. Arthur Beauchesne a aussi laissé une brochure publiée en 1912 dans laquelle il racontait avec plus d'éloges que n'en exige la vérité historique la carrière du premier ministre de l'époque, Robert Borden; deux tirés à part de *Canadian Bar Review* dans laquelle, en 1932, il expliqua les événements qui conduisirent à la Confédération et dans laquelle, en 1944, il soutint sur un ton de polémique que les législatures provinciales n'étaient pas des parlements.

Dans la *Revue de l'Université d'Ottawa* de juillet 1952, il expliqua aussi l'évolution du parlementarisme. En 1954, il publia un livre fort utile *Procedure at Meetings in Canada*, mais évidemment son ouvrage le plus célèbre est *Rules and Forms of the House of Commons of Canada, with Annotation and an Extensive Index*, qui connut sa première édition en 1922 et sa quatrième en 1958.

Arthur Beauchesne avait épousé le 14 juin, 1916, à Ottawa, Mlle Florence LeBlanc qui le précéda dans la tombe en 1941. Il avait deux filles, Madame James D. Forbes (Patricia) et Madame Ronald T. Walsh (Olive). Les biographies officielles disaient que ses récréations favorites étaient le jeu d'échecs et le golf.

Le journal *Le Droit* qui avait été témoin de son activité à Ottawa, après avoir rappelé, le 8 avril, les grandes qualités du disparu, écrivait : « M. Beauchesne est un grand Canadien qui a bien servi son pays. Tout le Canada regrettera sa mort. »

JEAN-CHARLES BONENFANT



Arthur Beauchesne

Charles Camsell

1876–1958

WITH the death of Charles Camsell, C.M.G., President of the Society 1930–1, on December 19, 1958, there passed an outstanding Canadian, one of the last of the explorers of the western mainland of Canada, a prominent geologist and a great civil servant.

The course of Camsell's life which brought him to prominence is full of interest. One of eleven children, he was born in 1876 at Fort Liard, in the Northwest Territories. He spent his childhood first on the banks of Liard River and later, when his father became Chief Factor of the Mackenzie River District for the Hudson's Bay Company, at Fort Simpson. There as a child, among traders, trappers, and Indians he heard how to live and travel in the north. When eight years old, in 1884, he went with his parents and his younger brothers and sisters in the York boat brigade up the Mackenzie and Slave rivers to Fort Smith where, after crossing the portage there, they continued by steamboat up the Slave and Athabasca rivers to Fort McMurray. Thence again by York boat they travelled up the Clearwater river to the Long Portage and on to Green Lake. They were then taken by ox-drawn Red River carts to Prince Albert. From there they drove to Fort Qu'Appelle by horse-drawn democrat, avoiding the usual route because of the unrest among the Indians which led a few months later to the second Riel Rebellion. At Fort Qu'Appelle they boarded the Canadian Pacific Railway to Winnipeg. There Camsell attended St. John's College. In 1891 he entered the University of Manitoba, taking chemistry, physics, mineralogy, botany, biology, and geology, and received his B.A. degree before he was eighteen in 1894. In July that year he started back to Fort Simpson and reached it just before freeze-up after an absence from home of ten years.

The next three years he spent at various Hudson's Bay posts and Anglican Missions, cutting logs and lumber, trapping, hunting, and fishing as well as teaching school. In his spare time, besides playing chess and cribbage, he read much serious literature, the only type available.

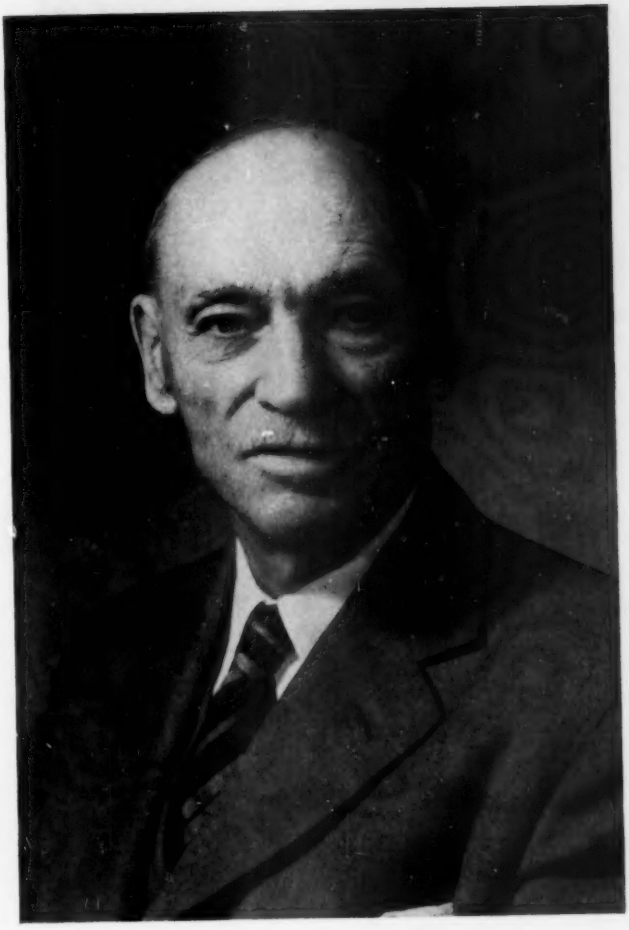
In the fall of 1897, with his elder brother Fred, he joined a party travelling via the Liard and Frances rivers to the Klondike. However, after a strenuous winter journey up these rivers, he, his brother, and one other forsook the Klondike to prospect around Frances Lake. There they spent the early summer of 1898, nearly starved, and returned to Lower Post on Liard River. The next year was occupied in building cabins, hunting, carrying mail by dog team down the Stikine valley to the Coast and freighting on Dease Lake and River. A rumour of a mineral strike near their home drew the brothers to Fort Simpson in September, 1899. That winter for four-and-a-half months, Camsell lived with one white man at Fort Wrigley cutting wood for the steamboat and working around the post. Through these early years he developed a strong, cheerful disposition, even temperament, splendid physique, co-ordination, and stamina.

Early in 1900 he went to Fort Providence and met James MacIntosh Bell who was in charge of a Geological Survey of Canada party on its way to explore Great Bear Lake. This was to prove a momentous meeting for Camsell. Bell enlisted him in the party and as the great accomplishments of Bell's work that summer owed much to Camsell's tireless and cheerful support, they brought renown to both young men. From this association with Bell grew Camsell's interest in the work of the Geological Survey and an ambition to extend his university training. As a result, after the New Year in 1901, he registered in geology at Queen's University. In spite of illness and lack of funds he continued his graduate studies at Harvard University in 1902, working in the summer months on explorations for the Algoma Central Railway, the Geological Survey, and the Canadian Northern Railway.

With his love for the northwest, he was trying to arrange for work there in June 1904, when he heard that he had been appointed to the staff of the Geological Survey. His early explorations for the Survey were in northern Ontario and in the Peace River country, but perhaps that of 1905, when he crossed the Yukon-Mackenzie divide and traversed the Wind and Peel rivers, is the best known. During the next few years his field work was in the Similkameen, in southern British Columbia, where among other tasks, he studied the unique gold deposits of Hedley and the ultramafic rocks of Tulameen. His memoirs for the Geological Survey on both these subjects, written partly while continuing graduate studies at the Massachusetts Institute of Technology in 1908, brought him recognition as a geologist and scientist.

In 1914 he was appointed "Geologist in Charge of Exploration," to plan the exploration of northern Canada. From his studies for this he wrote a paper on "The Unexplored Areas of Continental Canada," which was published in the *Journal of the Royal Geographical Society* in 1916 and aroused great interest. That same year too, he traversed the Tazin and Taltson rivers, north of Lake Athabasca, and this terminated his major field explorations at the age of 38.

In these years Camsell had become widely known and greatly liked everywhere, but particularly among the pioneers of mining in western Canada. He enjoyed the wilderness. He loved canoeing and was supreme at it, as his party realized one summer when they discovered he had run their canoes through rapids the local Indians would not face. He was exceptionally versatile and readily turned his hand to any new endeavour. For instance, when at the Hedley Labour Day Sports, though new to trap shooting, he beat the western United States champion in two matches. Based on his skill and experience his explorations were accomplished with a lack of mishap that made them seem simple. Camsell was, however, particularly respected for the quiet, straightforward, sympathetic, and friendly dignity that he showed to all, whatever their station in life. It was this character that overcame the difficulties with the hostile Indians when exploring the Severn



CHARLES CAMSELL

River. It made him immensely popular with prospectors in the Similkameen country and led them to confide the precious secrets of their work to him. It brought about such incidents as that of one prospector in the Tulameen shooting at another for doubting Camsell's determination of a mineral. In later years these same qualities stood him in good stead, in winning deep loyalty from his staff and in dealing with men, whether in scientific institutions, societies, or executive circles of government.

In 1915 he joined Number Three Field Company, R.C.E., as a sapper, but was recalled to the Geological Survey and assigned first to the Munitions Board and later to the Canadian Munitions Resources Commission to search for strategic minerals, work which led him to many parts of Canada from coast to coast.

In 1918 he opened a branch office for the Geological Survey in Vancouver and took charge of the geological work in British Columbia and the Yukon. Two years later he was appointed Deputy Minister of Mines and he continued as Deputy of the department when it was expanded to include Mines, Interior, Immigration, and Indian Affairs until he retired in 1948.

During the time Camsell was Deputy Minister he did much to build up the Mines Branch of his department and to make it a splendid research organization for the expansion of the Canadian mining industry. His influence on the Canadian mining industry, and in fact on all scientific work remotely allied with it, was remarkable. There were few important scientific committees or societies in those fields with which he was not involved. He was appointed to numerous boards, commissions, councils, and delegations and was the chairman of many. Among them were the International Niagara Board, the Dominion Fuel Board, and the Council of the Northwest Territories of which he was Commissioner for eleven years. He was a member of the National Research Council for fifteen years and a member of the Mineral Resources Section of the Imperial Institute. As a leading member of several Canadian delegations, he was sent to a number of conferences in Europe and the United States and was head of the Canadian delegation at the Empire Mining and Metallurgical Congress in South Africa.

Camsell belonged to many scientific and technical organizations and rose to leadership in several. He was a charter member of the Harvard Travellers Club, a Fellow of the Royal Geographical Society, Vice-President of the Geological Society of America, President of the Canadian Institute of Mining and Metallurgy, President of the Engineering Institute of Canada, founder and President of the Canadian Geographical Society, as well as a founder and first chairman of the Board of Governors of the Arctic Institute of North America. In 1935 he was made a Companion of the Order of St. Michael and St. George. Among many medals and awards he received the Murchison Grant in 1922 and the Founders Medal in 1946 of the Royal Geographical Society, the R. B. Bennett prize of the Royal Society of Arts, and the Gold Medal of the Institution of Mining and Metallurgy.

On his retirement from the Civil Service after forty-four years he continued active as a consultant and became a member of the Board of Directors of Ventures Limited.

The Charles Camsell Hospital in Edmonton for tubercular Indians and Eskimos which he did much to establish is named for him as is the Camsell Range west of Fort Simpson.

He married Isabel Doucie Thomas in Vancouver in 1905, and is survived by his widow, a son, and two daughters.

H. S. Bostock

Jean Chauvin

1895–1958

FILS de Léon-Adolphe Chauvin, qui fut député de Terrebonne, et de Berthe Gagnon, Jean Chauvin naquit à Sainte-Rose, P.Q., le 20 juillet, 1895. Il fit ses études au Collège de l'Assomption, au Collège de Montréal et à l'Université de Montréal où il s'inscrivit à la Faculté de Droit. La première grande guerre mit fin à une carrière d'avocat qui aurait été sans doute brillante. Emporté par sa nature chevaleresque et sans attendre la fin de sa dernière année d'étude Jean Chauvin décida de s'enrôler. Refusé par l'armée canadienne, à cause d'une vue déjà faible, il traversa l'Atlantique à ses frais et joignit la Légion étrangère. Combattant de première ligne il fut gazé deux fois et blessé grièvement. La France reconnut la bravoure de ce volontaire canadien en le décorant de la Croix de Guerre avec deux étoiles.

De ses exploits de légionnaire, Jean Chauvin refusa toujours de parler, même avec ses intimes. Comme tout véritable courage le sien était modeste. Ce qui ne l'empêchait pas de le manifester, et de façon péremptoire, chaque fois qu'il croyait devoir combattre une injustice ou défendre un ami.

A sa rentrée dans la vie civile, Jean Chauvin choisit la carrière de journaliste. Au journal *Le Devoir*, où il fit équipe avec Philippe Panneton, Victor Barbeau et autres jeunes d'avenir, il révéla son précoce talent d'écrivain et le tour d'esprit, alerte et fin, qui fut l'un des charmes de sa grande personnalité. Bientôt remarqué, le poste de rédacteur-en-chef de la *Revue populaire* (qu'il occupa jusqu'à ses derniers moments) lui fut offert. Il l'accepta, conscient de faire œuvre utile en aidant à la diffusion de cette culture générale qui était sienne et qu'il s'efforça sans cesse d'encourager autour de lui. Car, sous une désinvolture élégante, ce journaliste cultivé cachait l'ambition de servir, à sa manière, son pays et ses compatriotes. D'où les divers postes qu'il accepta d'occuper, malgré sa répugnance à sortir de l'ombre dont il s'est plu à envelopper sa vie : membre de jurés artistiques, Président du Comité de publicité du Ministère des Finances pendant la dernière grande guerre, conseiller d'administration du Musée National, à Ottawa, et du Musée des Beaux-Arts, à Montréal, etc. D'où aussi l'unique livre qu'il nous a laissé, *Ateliers*. Dans cet ouvrage, remarquable par la qualité du style et l'originalité de la présentation l'auteur, dont l'intérêt demeura toujours partagé entre la littérature et les arts plastiques, ne fait pas seulement œuvre d'artiste. Il fait également œuvre d'animateur et de pédagogue. Sous prétexte de faire connaître vingt-deux peintres et sculpteurs canadiens il invite ses jeunes compatriotes à profiter des leçons de courage, de persévérance et de probité en art qui se dégagent de ces vingt-deux vies consacrées à la poursuite d'un idéal de beauté.

En l'accueillant dans sa première Section, dont il fut éventuellement le président, la Société Royale n'a pas tenu compte seulement de ses écrits dans les deux langues officielles du pays. Elle a voulu, de plus, reconnaître l'in-

fluence heureuse que Jean Chauvin a exercé sur toute une génération de peintres et d'écrivains. La modestie de l'auteur d'*Ateliers* lui ferait nier ce rôle, mais la vérité oblige à le rappeler. Ce gentilhomme lettré, artiste dans l'âme, qui fut le prototype de l' « honnête homme » tel qu'on l'entendait au Grand Siècle, cet ami d'une loyauté sans reproche, fut aussi un canadien modèle. C'est pourquoi son brusque départ crée un vide sensible au sein de la Société Royale et dans ce Canada qu'il a servi avec son grand cœur et un indiscutable talent.

CLAUDE MÉLANÇON

JEAN CHAUVIN

William Vernon Cone

1897–1959

WILLIAM CONE, B.S., M.D., Hon. D.C.L., F.R.C.S. (C), F.R.S.C., Professor of Neurosurgery of McGill University, Neuropathologist, and Neurosurgeon in Chief of the Montreal Neurological Institute, died on May 3, 1959. The end came without warning after he had seen his patients late at night. He was at the height of his capacity, loved by many grateful patients and by his many friends and associates. He was survived by a devoted wife, Avis, and his only brother, Doctor Alfred Cone, otolaryngologist of Washington University, St. Louis. William Cone was born in Conesville, Iowa, of American parents, Scottish stock on his father's side and English Quaker stock on his mother's side. His father died when William was four years of age and his brother two years of age. He attended the University of Iowa. After winning his doctorate in medicine he was married to Mrs. Cone, also a graduate of Iowa University.

As an undergraduate he devoted his spare time to neuropathology and on qualification was granted a National Research Council Fellowship to continue this study in the psychiatric clinic of Professor Samuel Orton. The following year he went to New York to work with Professor Frederick Gay at Columbia University. After a short period he transferred to the Presbyterian Hospital in New York where he was associated with Dr. Wilder Penfield in the Department of Surgery. Together they founded the Laboratory of Neurocytology at that hospital.

In 1928, after six months' study abroad on a Guggenheim Fellowship, he and Mrs. Cone settled in Montreal. Here he worked as neuropathologist at McGill University and neurosurgeon at the Royal Victoria Hospital and the Montreal General Hospital. He was co-founder of the Montreal Neurological Institute which opened its doors six years later.

He became Director of the Laboratory of Neuropathology in that Institute and continued to carry out research and teaching in that laboratory to the end of his life, in addition to the very active neurosurgical practice that soon was his, and the teaching of neurosurgery. During the Second World War he went, with the rank of Lieutenant Colonel, to England with his friend and neurological associate, Dr. Colin K. Russel, to establish the R.C.A.M.C. Neurological Hospital at Basingstoke.

Dr. Cone's primary interest was in the cause of disease and of human disability. As years passed he devoted himself more and more to discovering better and more effective methods of treatment. He had a remarkable mind and an extraordniary memory and was endowed with great physical endurance. Always an idealist and an unsatisfied perfectionist, he laboured through long days as surgeon and clinician. Almost every night he could be discovered in the Neuropathology Laboratory guiding his loyal assistants in their microscopic work and stimulating them to research.

He preferred to teach by example and by word of mouth. He found it increasingly difficult to publish the wealth of conclusions that came from his fertile mind, postponing final formulation in the hope that he could come closer to perfection. In spite of that, however, he published forty-two papers alone and with collaborators. These reports indicate the wide range of his interests from poliomyelitis, the microscopic structure of the optic nerve, neuroglia, brain tumours, and histological techniques to the use of antibiotics on the brain and meninges, treatment of ruptured intervertebral discs, fractures of skull and spine, care of the paralysed bladder, surgical techniques, invention and construction of surgical apparatus. He organized helicopter transportation of desperate neurosurgical patients for emergency treatment.

His associates knew full well that this modest, unassuming, tireless man was doing the work of two ordinary individuals and sacrificing himself to it. And yet he always found time to comfort and to advise his patients, time to befriend and to teach his associates, whether doctor, nurse, student, or technician. He lived and worked with fierce intensity. But he lived the way he wanted to live, rejoicing in the supreme effort to achieve perfection. And yet, like many a perfectionist, there was in him a deep undercurrent of sadness which not even his closest friends could quite dispel. As the years passed this sadness came to show itself when his face was at rest. An urge, the urge which Kingsley called "divine discontent," seemed to drive him on. It gained an ever more compelling hold on him. He could not face the thought of rest or retirement. He became a magnificent operator. Indeed, in a recent letter, Professor Sir Geoffrey Jefferson of Manchester spoke of him as follows: "I suppose Bill Cone was amongst the best surgeons in the world . . . several people have said to me that he was the best surgeon they had ever seen."

Dr. Arthur Elvidge, who worked closely with Dr. Cone for twenty-eight years, as assistant and later as a colleague, concluded an obituary note in the *McGill News* as follows: "He could not tolerate shoddy work. He could never attain perfection and strove to reach it. . . . His work will be appreciated more and more. His work will shine for many years to come, to brighten the way for patient, student and colleague. He came to McGill and gave all he had. I saw him come and I felt him go. In fondest memory. . . ."

William Cone's restless spirit is quiet at last. Failure to achieve perfection in his own work and that of the Institute to which he gave his life seemed to him an intolerable tragedy. And yet his associates, no less aware of their shortcomings, were made happier as well as more effective because of his friendship, his teaching, and his example. Much of the success that has come to us who worked with him is thanks to what he did for us.

WILDER PENFIELD

William Vernon Cone

George Vibert Douglas

1892–1958

GEORGE VIBERT DOUGLAS who died on October 8, 1958, had been a fellow of the Society since 1944. He was born at Montreal in 1892, the grandson of the Rev. George Douglas, the first principal of Wesleyan Theological College, and of Captain J. A. Vibert, at one time the Port Warden of Montreal.

He was educated at McGill, then at the Royal School of Mines, and later returned to McGill from which he graduated with a Masters degree in Mining and Geology. While at McGill he underwent military training in the C.O.T.C., and during the First World War served as a lieutenant and later as captain in the Northumberland Fusiliers and the Royal Engineers. He was twice mentioned in despatches and was awarded the Military Cross.

In 1921 and 1922 he was geologist on the "Quest" expedition to Antarctica, led by Sir Ernest Shackleton. At this time he was granted the privileges of honorary membership at Emmanuel College, Cambridge, and much of his "Quest" report was written there.

Returning to America, he was for two years assistant to Professor R. A. Daly at Harvard, and then again he left these shores, this time for Spain and Rhodesia, as Chief Geologist to the Rio Tinto Mining Company.

Returning to Canada in 1932, he was the first incumbent of the newly established Carnegie Chair of Geology at Dalhousie University. This chair he occupied until his retirement in 1957, after which he lectured at the University of Toronto and engaged in geological consulting.

Besides this society, he was a fellow of the Geological Society of London, the Geological Society of America, the Arctic Institute of North America, and member of the Canadian Institute of Mining and Metallurgy, the Engineering Institute of Canada, and the Canadian Institute of International Affairs.

During his years at Dalhousie he did geological field work for the Province of Quebec, for the Colony of Newfoundland, and for the Province of Nova Scotia, for the last as Provincial Geologist for several years. He is the author or co-author of fifty-seven articles of a scientific nature, and on such diverse subjects as "Spectroscopy Applied to Mineral Determination" (1924); "On the Theory of Continental Drift" (1934); and "The Deposition of Gypsum and Anhydrite" (1957).

George Douglas had an eventful life. He travelled widely. He met and was a friend to many people. He wrote much and his voice was frequently heard in scientific conclaves. But in the opinion of this writer, his niche in posterity is most assured by the influence that he exercised on the students with whom he came in contact at Dalhousie. In them he instilled an overwhelming feeling of scientific curiosity and inspired them to a search for truth. He taught them to argue without rancor, and he himself was a firm

friend of many with whom he disagreed. Douglas had the ability to make geology come alive in his lectures, and he encouraged many of his students to make their maiden speech on the floor of the Dawson Geological Club which he founded in his second year at Dalhousie.

He was a man of unbounded physical energy, and this, coupled with his tremendous enthusiasm could and did result in feats of endurance that put much younger men to complete shame.

Professor Douglas was married in 1924 to Olga Margaret Crichton of County Sligo, Ireland, who survives. They have four children, Mrs. Elizabeth Cleasby, of Nottingham, England, and Mary, Patrick, and John of Toronto. They comprised a closely knit family unit and their home became the meeting place of those interested in art and in science. A sister, Dr. A. Vibert Douglas of Queen's University, Kingston, and a grandchild, Anne Cleasby of Nottingham, also survive.

L. J. WEEKS

GEORGE VIBERT DOUGLAS

Arthur Gibson

1875–1959

DR. ARTHUR GIBSON, one of the pioneers in entomology in the federal government service and for twenty-two years Dominion Entomologist, died in hospital at Brockville, Ontario, on April 16, 1959. Dr. Gibson was born in Toronto on December 23, 1875, and received his education in that city. During his youth he was a keen naturalist and amateur entomologist, with special interest in the *Lepidoptera*. Before he began his professional career in the Government service, he published several papers in the annual reports of the Entomological Society of Ontario.

Dr. Gibson joined the Department of Agriculture at Ottawa in 1899, as assistant to Dr. James Fletcher, the first Dominion Entomologist. He was promoted to Assistant Entomologist in 1905 and to Chief Assistant three years later. He served for ten years under Fletcher, until the latter's death in 1908, and for eleven years under Dr. C. Gordon Hewitt, who was appointed Dominion Entomologist in 1909. During Hewitt's term, the entomological service developed from a small unit in the Experimental Farms Branch to a separate branch of the Department and established field laboratories in several of the provinces. When the Entomological Branch was established in 1914, Dr. Gibson was appointed Chief, Division of Field Crop and Garden Insects. He became Dominion Entomologist when Hewitt died in 1920, and, in 1938 when the Entomological Branch became a division of the newly formed Science Service, he was made Associate Director of the Service and Chief, Division of Entomology. He retired in 1942.

Like many professional entomologists of his time, Dr. Gibson did not receive formal training in entomology; his natural talents were developed under the guidance of Fletcher and Hewitt, both distinguished in the field. His broad knowledge and executive ability were invaluable in directing and administering the varied activities of the entomological service throughout the Dominion. During his forty-two years with the Department he came to know almost every entomologist in Canada and many of the workers in associated fields of science. A kind, friendly, and unassuming man, he maintained good personal relations and *esprit de corps* in the Division. He was well known abroad and kept in touch with leading entomologists in different parts of the world.

Dr. Gibson's wide interests and contacts are indicated by the many offices he held during his career. He was chairman of the Canada Destructive Insect and Pest Act Advisory Board, of the Federal Apple Maggot Advisory Board, and of the Committee on Research, Canadian Horticultural Council. He was a member of the Dominion Inter-departmental Advisory Board on Wildlife Protection; the Canada Agricultural Pests Control Act Advisory Board; the Management Committee of the Imperial Institute of Entomology, London; and the Lyman Entomological Bequest Committee,

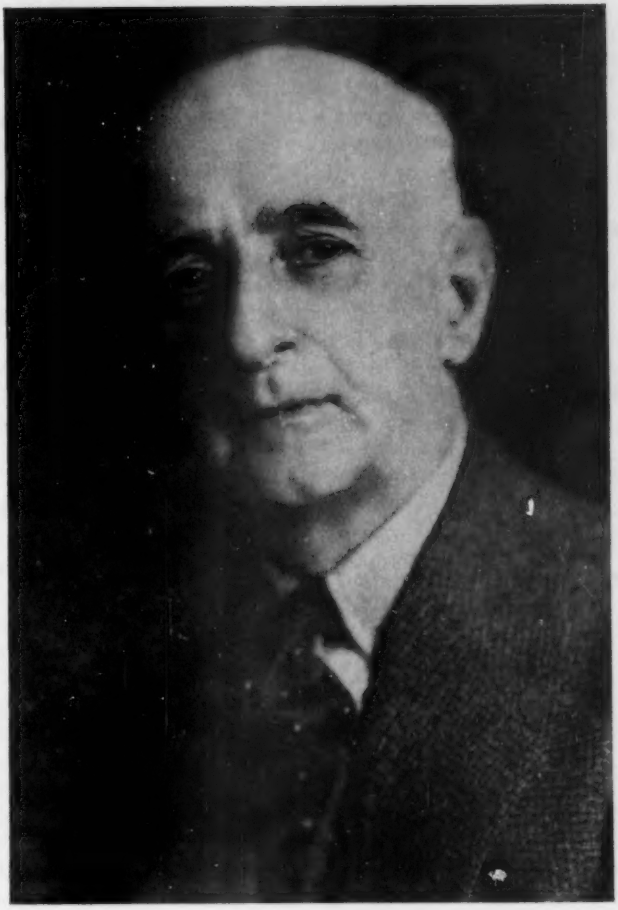
McGill University. He was Honorary Curator of Entomology, National Museum of Canada. He was a president of the American Association of Economic Entomologists, the Entomological Society of America, the Entomological Society of Ontario, the Eastern Ontario Branch of the Canadian Society of Technical Agriculturists, and the Ottawa Field-Naturalists' Club. He was elected a fellow of the Royal Society of Canada, the Royal Entomological Society of London, the Entomological Society of America, and the American Association for the Advancement of Science. He represented Canada at various international and Commonwealth conferences. In 1935 his outstanding service was recognized by Queen's University, which conferred on him the honorary degree of LL.D.

As Dominion Entomologist, Dr. Gibson never lost sight of the main purpose of the entomological service, namely, to develop effective methods of controlling insect pests for the well-being of Canada. To this end he maintained and extended the service and, during the difficult, financially stringent period between the two world wars, continued to stress the importance of insects in the economy of the country and fought for progressively larger appropriations to enable the service to deal with the many and varied insect problems.

Dr. Gibson published more than 200 scientific and popular articles. They dealt with such important pests as cutworms, flea beetles, grasshoppers, root maggots, the Colorado potato bettle, greenhouse insects, insects of the flower garden, and household insects. After his retirement he completed a 1,200-page manuscript, "Entomology in Canada, with Special Reference to Developments within the Dominion Department of Agriculture."

For a number of years after his retirement, Dr. Gibson, with his wife, Ray, and daughter, Elaine, spent the winters at Gulfport, Mississippi, and St. Augustine, Florida, and the summers at Maitland, Ontario. Several years ago they settled in Brockville. Another daughter, Gerrie (Mrs. Charles Palm), lives at Ithaca, New York.

W. J. Brown



ARTHUR GIBSON

Claude Laurent Pierre Masson

1880–1959

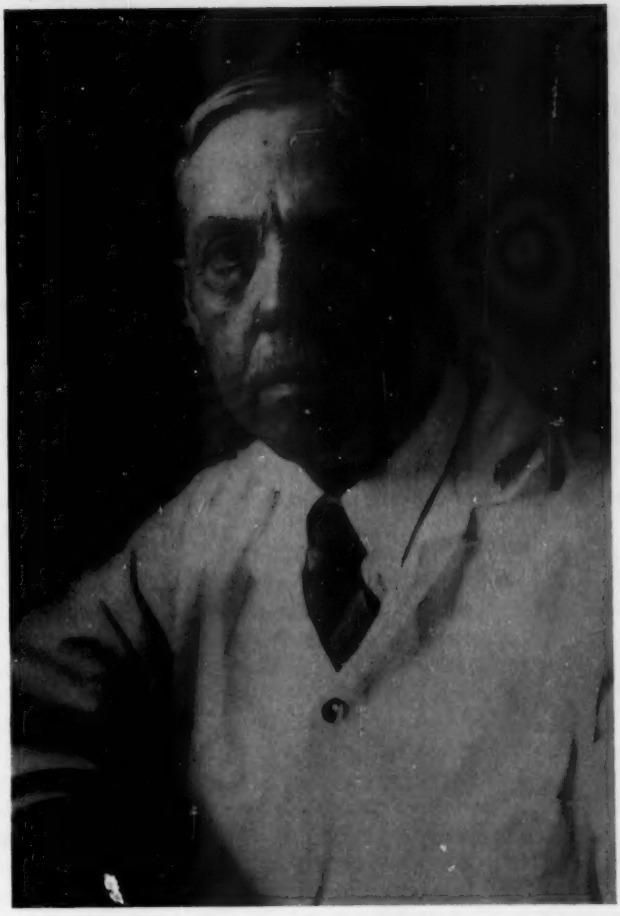
CLAUDE LAURENT PIERRE MASSON, né à Dijon le 12 novembre 1880, fut reçu bachelier ès lettres en 1898. Il avait commencé ses études médicales lorsqu'une grave maladie le força à les interrompre. Il entra alors à la Faculté des Sciences de Dijon comme préparateur du Professeur Bataillon, célèbre biologiste français connu spécialement pour ses recherches sur la parthénogénèse artificielle. Licencié ès sciences naturelles en 1905, le Professeur Masson poursuivit ses études de biologie jusqu'en 1907, date à laquelle il alla compléter à Paris ses études médicales. Il devint docteur en médecine (Paris) en 1909. La même année, il devenait assistant du bactériologiste Borrel à l'Institut Pasteur de Paris, tout en pratiquant l'anatomie pathologique comme chef de laboratoire dans divers hôpitaux. Au début de la guerre de 1914, il fut fait prisonnier et passa une année dans un camp de concentration de la Prusse orientale. Libéré à la suite d'une échange de prisonniers, il fut affecté au Groupe de Services Chirurgicaux et Scientifiques de Bouleuse. A l'armistice, il était nommé professeur d'anatomie pathologique à la Faculté de Médecine de Strasbourg dont l'Institut se signala bientôt, grâce à ses travaux personnels et à ceux de ses élèves. En 1927, il devint professeur d'anatomie pathologique à la Faculté de Médecine de l'Université de Montréal et fut chargé de l'organisation des laboratoires d'anatomie pathologique des hôpitaux Notre-Dame, Hôtel-Dieu et Ste-Justine de Montréal. Il était en outre pathologiste consultant de la plupart des hôpitaux de Montréal.

Le Professeur Masson était membre adjoint de la Société Anatomique de Paris (1909) et membre de l'association française pour l'étude du cancer (1909), Chevalier de la Légion d'Honneur (1924) et Officier de la Légion d'Honneur (1955). Par la suite, il devint : membre de la Société Royale du Canada (1931); membre de l'Académie Nationale de Médecine (1944); membre honoraire de la New York Pathological Society (1954); membre honoraire de la Société Pathologique Mexicaine (1954); membre honoraire de la Pathological Society of Great Britain and Ireland (1955); docteur honoraire de l'Université McGill (1940); docteur honoraire de l'Université de Montréal (1929); docteur honoraire de l'Université Laval (1957); docteur honoraire de l'Université d'Ottawa (1958).

Le Professeur Masson a publié 133 travaux dont deux volumes intitulés : « Tumeurs Humaines » .

Les travaux scientifiques du Professeur Pierre Masson portent surtout sur le système nerveux végétatif et sur le système nerveux périphérique, ainsi que sur les glandes génitales.

JOSEPH-LUC RIOPELLE



Claude Laurent Pierre Masson

William Everett McNeill

1876–1959

WILLIAM EVERETT McNEILL, a Fellow of the Royal Society since 1936 and on the retired list since 1947, died on May 8, 1959, in his eighty-third year.

He was born in Lower Montague, Prince Edward Island, in 1876. As a boy of talent he attended Prince of Wales College and won scholarships which enabled him to go to Acadia University. More than fifty years later, Queen's University, to mark his distinguished service, established a valuable entrance scholarship in his name open to students of Prince of Wales College.

He completed his undergraduate work at Acadia with such distinction that he went on to Harvard and as was customary for Maritime students of that day, he enrolled in Harvard College, graduating A.B. in 1902. His chosen field of study was English language and literature and for the next three years he taught English at Bates College, Maine. Here began a life-long friendship with Dr. A. L. Clark, who came to Queen's University from Bates College and was for many years Professor of Physics and Dean of the Faculty of Applied Science. In 1906, McNeill returned to Harvard for graduate studies in English but not before he had married Caroline Libby, a language teacher at Bates.

W. E. McNeill was an able scholar, precise, thorough, and industrious who found in the Harvard Graduate School the environment which stimulated his talents and aroused his admiration. While a graduate student, he became assistant to Professor George Lyman Kittredge, famous for more than a generation as a scholar and as a character. Here were the highest standards of precise scholarship. W. E. McNeill's admiration for Kittredge shaped many of his interests and was tinged with awe.

McNeill obtained his Ph.D. in 1909 and after a summer term at Oxford, he came to Queen's in the fall of that year as an Assistant Professor of English under James Cappon. Here, too, he encountered a redoubtable personality. Cappon retained much of the aloofness and authority of the Scottish Professor and McNeill at first was very much of an assistant taking a large share of the elementary work but not allowed to lecture to honours students on Shakespeare. Trained under Edward Caird, Cappon was inclined to be scornful of Harvard's philology and Kittredge's detailed scholarship. In the Harvard which W. E. McNeill knew, there was more than a touch of austerity and learning had some lingering association with asceticism. Cappon was no ascetic. He took himself seriously as a scholar but he took equally seriously his opinions and prejudices about the United States, the Boer War, and British politics. Bewildered at first, W. E. McNeill came to appreciate Cappon as a scholar, articulate and finely perceptive, with philosophic insights beyond the range of the philologists. Cappon, too, came

to appreciate the young man on whose accuracy he could rely, who would take up with enthusiasm the classes in Anglo-Saxon and Old English and was eventually to be trusted to lecture on Shakespeare.

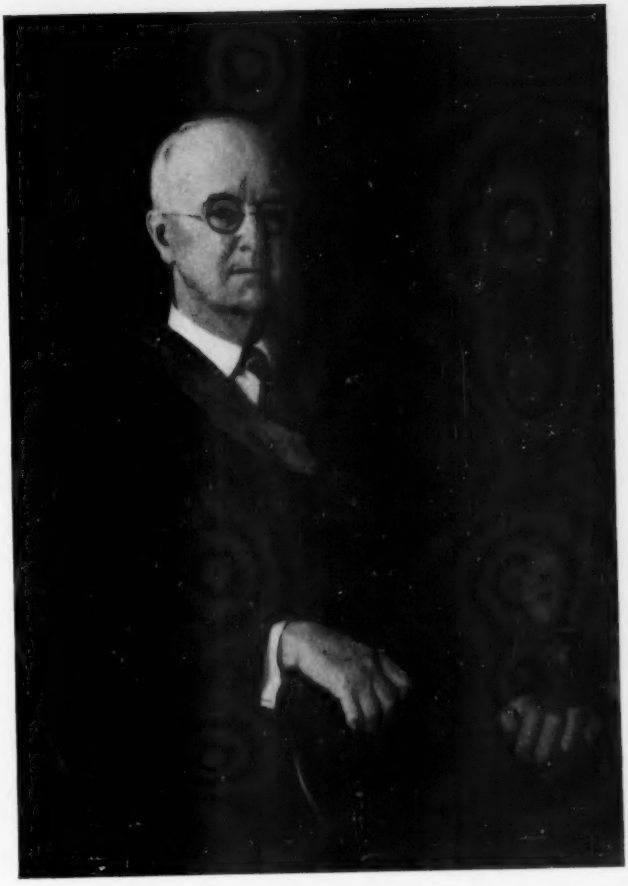
As a teacher, W. E. McNeill achieved a sound reputation. He was orderly, always thoroughly prepared and knowledgeable, always intolerant of glib superficiality. With experience, the rigorous Harvard tradition mellowed and the range of his literary appreciation widened. The serious student found in him a clear and systematic lecturer, ready to expend his time and energies on the student who showed interest and application.

In 1920, W. E. McNeill gave up his teaching duties and became Registrar and Treasurer of Queen's University. Here he established a second and greater reputation. As Registrar, he brought order and tidiness where traditional practices had been continued too long. Necessarily, he disturbed some of his older colleagues. Though quite without financial experience, he achieved an even greater reputation as Treasurer. He husbanded the University's resources with meticulous care and miraculous results. No economy was too small for him to make. No addition to revenue was too insignificant to be worth an effort. His financial administration through the depression of the 1930's when salaries at Queen's University (by no means extravagant) were maintained without any reduction and when very substantial capital sums were spent on the modernization of buildings, was a model of thrift and resource in Canadian university finance.

In 1930 he gave up the Registrar's duties and became Vice-Principal and Treasurer. In these positions he was a Queen's institution and at the same time, his judgments became more generous, his alertness was heightened and his loyalty to the University became a ruling passion. As the University's appreciation of his services grew, his attachment became warmer. He retired in 1947 and, at the suggestion of the Chancellor, was elected a member of the Board of Trustees, a post which he held until shortly before his death.

Throughout his life, he took great interest in writing and speaking and yet his own writings and speeches were comparatively few. In his earlier years, they were mannered in their precision and correctness and logical rather than persuasive. Gradually he uncovered a talent for terse but moving prose, enriched by treasured quotations. His address, "Have you Anything to Declare?" at the Convocation in 1947, when on the occasion of his retirement he received an honorary degree, is perhaps the finest example of this talent. It was reprinted by the University in response to widespread requests and many thousands of copies have been circulated on request throughout the English-speaking world. Before and during his retirement, he recorded and assembled a notable series of discs and tape-recordings of spoken English.

English language and literature and Queen's University were W. E. McNeill's life. Careful and thrifty to a fault, it was a great source of satisfaction to him in his old age to know that in leaving his estate ultimately to the University, he would be able to repay all the salary which had been



William Everett McNeill

paid to him during his thirty-eight years of service, and thereby provide a substantial endowment for a Chair in English to be named for James Cappon.

W. A. MACKINTOSH

Richard Birnie Miller

1915–1959

RICHARD BIRNIE MILLER was born at Weyburn, Saskatchewan, on March 29, 1915, the son of Judge Moore A. Miller and Caroline M. Birnie, now resident at Cobourg, Ontario. He was a fifth generation Canadian. He obtained his early education at Weyburn and then attended the University of Toronto. He graduated from that institution in 1936 with a degree of B.A. in Honours Biology and with the Gold Medal in Science awarded by Victoria College. In the 1936–7 session he held his first appointment at the University of Alberta as Fellow in Zoology. He was awarded his M.A. degree by the University of Toronto in 1937, for research carried out on the bottom fauna of five Algonquin Park lakes. This programme was undertaken at the Ontario Fisheries Research Laboratory of which he was one of the original members. He obtained the Ph.D. degree from the University of Toronto for work on the Ecology of the Chironomidae of Costello Lake, Algonquin Park.

In 1939 he was appointed Lecturer at the University of Alberta in the Department of Zoology. He became Assistant Professor in 1944; Associate Professor in 1946; and Professor in 1950. In 1956 he became Head of the Department. For many years he carried a very heavy teaching and administrative load and it was a matter of amazement to his colleagues to see the amount of research he was able to accomplish notwithstanding. This research has been recorded in more than seventy published papers.

He was Chairman of the University of Alberta's Research Fund Committee until the time of his death, President of the Science Association, and President of the Men's Faculty Club.

In 1937 he married Lillian Frances Harkness and they became the proud parents of a son Richard in 1938 and a daughter Anne in 1942. Richard has completed his third year in Honours Physics and gives every indication of following his father into the academic field.

Miller played a prominent part in the Canadian scientific community and an invaluable role in the development of conservation practices in Alberta. He was an Associate Biologist with the Fisheries Research Board of Canada from 1944–6. He organized the Canadian Whitefish inspection service for the Department of Fisheries during 1944–5 and was Co-ordinator of Canadian Triaenophorus Research from 1946–52, during which time a successful attack was made on the infestation of whitefish by the tapeworm Triaenophorus, whose life history he worked out in 1942. In 1954 he was President of the Canadian Committee on Freshwater Fisheries. He was associated with the National Research Council Committee on Aquatic Biology from 1952 and acted as consultant to the Alberta Department of Lands and Forests from 1942.

In 1950 in collaboration with the Department of Lands and Forests of the Province of Alberta he was instrumental in establishing a fish and wildlife research station in the Gorge Creek area of the Foothills. The station has been completed this summer according to his plans by a combined effort of the Government of the Province of Alberta, the National Research Council of Canada, and the University of Alberta. It was here that he made his important discoveries concerning the role of competition between planted and native fish. Last summer he made a fundamental breakthrough on basic physiological research and laid the foundation for the ultimate production of hatchery-reared fingerling trout that will survive sufficiently long to replace less desirable fish already present. This work is being continued by students he had trained. The continuation of this station and his research programme will be a tribute to his vision and energy.

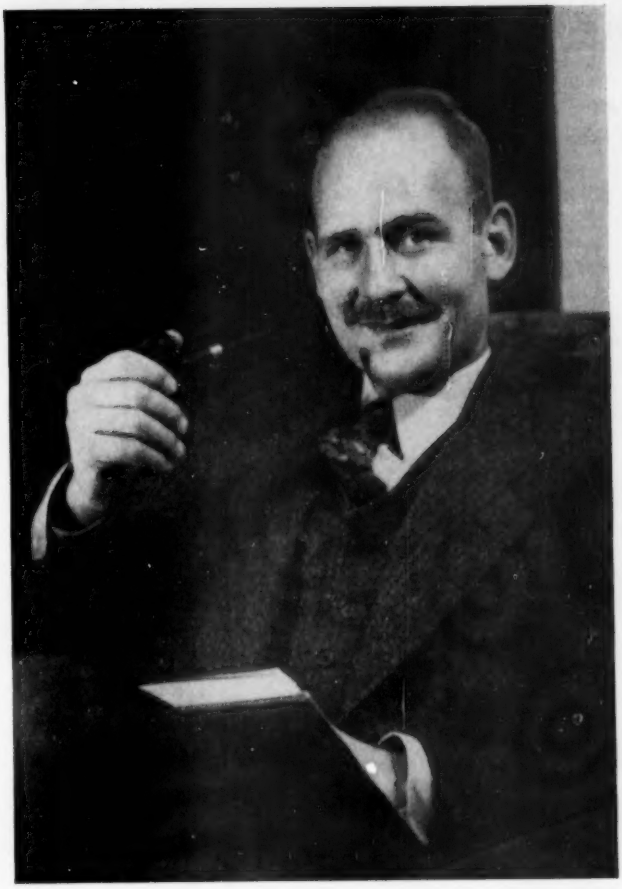
He was a valued member of numerous scientific societies. He was a Founding Member of the Canadian Conservation Association, an Associate of the Arctic Institute of North America, a member of the American Fisheries Society, the American Society of Limnology and Oceanography, the American Academy of Science, the Society of Systematic Zoology and the Wildlife Society of America, of which he was Vice-President in 1957.

He was appointed Alberta's representative to the National Research Council of Canada in 1956. He was named Mid-Western representative to the Fisheries Research Board of Canada in 1957.

Miller was a real man's man and was never happier than when prowling about the woods, scrambling up a rocky creek or paddling about a mountain lake. He brought to the out-of-doors the mind of the scientist but also the soul of the artist. He loved the wilds and this brought special meaning and significance to his work.

He was an inspiring teacher and his lectures were masterpieces of logical and clear exposition. They were also lightened with his humour and enriched with anecdotes of his personal experiences. It was a thrill to see him with a group of his students around a campfire by a rushing mountain stream discussing the findings of the day. They would be picking his brains and bringing to him all their problems and theories. Miller, with his back to a log and his pipe drawing well would courteously and thoughtfully answer each question and freely give the benefit of his extensive knowledge. In this way the students got their most effective training.

Miller was a well-rounded man. He was widely read in many diverse fields. He loved music, particularly operatic selections. He had a fine tenor voice and sang for several years with the University Singers. His artistic ability was well shown in the excellent sculpture which he did. His Irish ancestry showed through in a delightful sense of humour. He wrote charming prose and poetry in a lighter vein, very often only for the amusement of those fortunate enough to be his intimates. These qualities made him a delightful companion and brought him many warm friendships. Just six weeks prior to his death he signed a contract with Longmans Green for the



Richard Birnie Miller

publication of a book relating his experiences as a Conservation Biologist. His untimely death on February 21 at the age of forty-four cut short a scientific career of great accomplishment and even greater promise.

M. J. HUSTON

Kenneth W. Neatby

1900–1958

THE scribes may enter his achievements in the record but it is the man himself that we remember. Dr. Kenneth W. Neatby was well loved by his friends and colleagues for his ready wit, his charming manners, his kindly consideration of others, and his capacity to enjoy life whether in the field of sport, music, or just plain good conversation. His death on October 27, 1958, however, terminated a life that was full of worthwhile achievement.

Dr. Neatby was born at Sutton, Surrey, England, on March 30, 1900, and in 1906 his family moved to Canada. His father was a medical man who practised medicine for a short time at Earl Grey, Saskatchewan, and at Watrous, where he became a homesteader. Kenneth was one of a large family. He had ample opportunity to learn of practical farm problems at first hand and, like many others, decided that by bettering his knowledge he could make some contributions to their solution. He obtained the B.S.A. degree from the University of Saskatchewan in 1924 and the M.S.A. degree in 1926. It was here that I came to know him and to value his excellent qualities. Later, there was profound satisfaction in having him for a colleague in the cereal breeding work started in 1925 at the Dominion Rust Research Laboratory in Winnipeg. He came to Winnipeg after graduating in 1926. In 1931, the University of Minnesota granted him a Ph.D. in plant breeding and genetics. In 1933–4, he spent a year at Cambridge, continuing there his studies on the genetics of resistance to rust in wheat.

From the beginning of Dr. Neatby's scientific studies, he was clearly headed towards a notable career. The job at Winnipeg was to produce varieties that were good in quality, good in agronomic performance, and resistant to stem and leaf rust. This in itself was a challenge, especially since many scientists of repute stated that it could not be done, but Dr. Neatby was determined not only to succeed in the practical job but also to add to the store of fundamental knowledge on the genetics of resistance to disease. I was fortunate to be associated with him and J. N. Welsh in the discovery of the mode of inheritance of mature plant resistance in wheat. This served to clarify the behaviour of many varieties in the field, and the gene for this type of resistance to stem rust is now incorporated in a series of varieties, beginning with Renown and ending with Selkirk, which has been such a spectacular success. Dr. Neatby, in his own work, specialized on the inheritance of resistance to individual races of stem rust and was particularly interested in the interrelation of the genes for rust resistance and the groups of rust races that they controlled. He laid the foundation for work that is still going on in classifying and identifying genes for resistance to rust in wheat.

At Cambridge, Dr. Neatby became intimately acquainted with Sir Roland Biffin, who was the first man to delve into the genetics of resistance to rust.

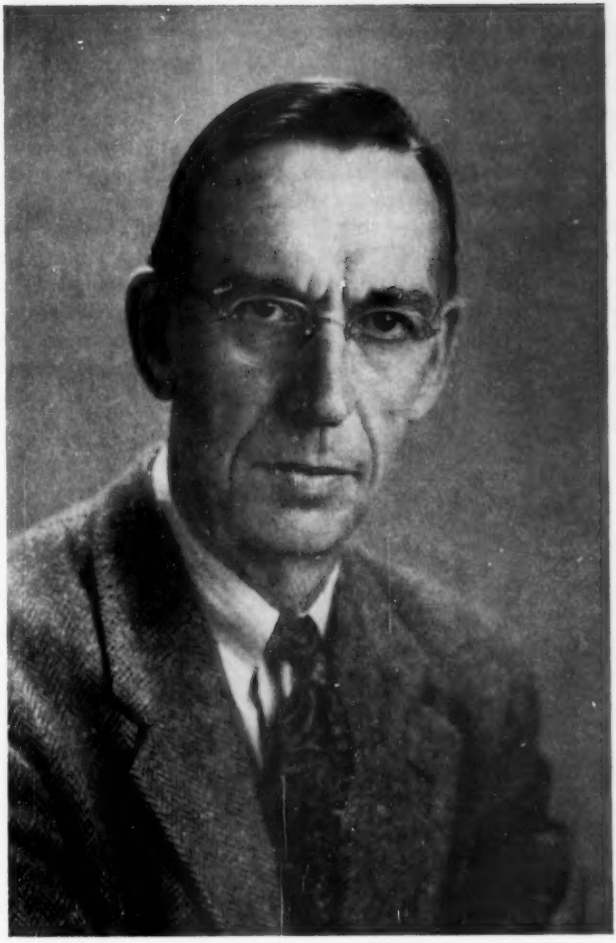
Sir Roland, too, was one of the few men in the world at that time who believed that plant breeders could do something about rust epidemics. He was tremendously interested in the work going on at Winnipeg and his good wishes were an inspiration to Dr. Neatby and the others engaged in this work.

In 1935, the University of Alberta asked Dr. Neatby to go to Edmonton as head of the Department of Field Crops. On accepting this post, he immediately began to exert an influence on the course of agricultural science in this country. He insisted on an intensification of fundamental studies and on the necessity of all research workers in agriculture obtaining a first-class training in the basic sciences. He was formulating at this time ideas on which he spoke and wrote at considerable length in later years. He did not hesitate to criticize when it seemed to him that criticism was due. He attacked agricultural colleges for insufficient attention to training in the fundamental sciences. He was a fluent writer and speaker, which can undoubtedly be attributed to an intellectual home environment and to a wide reading of the classics, biography, history, and other works of literary value. He set a high standard and left a mark at which many a young man may shoot in vain but from which he will at least gain in the attempt.

During the next stage of his career, from 1940 to 1946, Dr. Neatby was Director of the Farm Service of the North-West Line Elevators Association at Winnipeg. In this period, he obtained a first-hand knowledge of the problems of farm extension work. He continued his intensive study of agricultural problems and became very conscious of the need for high-class research in agriculture, in view of the extreme complexity of the problems and the need for the application of a wide range of scientific disciplines. He seemed destined, therefore, to be asked in 1946 to accept the post of Director of Science Service in the Canadian Department of Agriculture. He came to this position with a good record of productivity in basic and applied science, knowledge of the problems in agricultural education, an intimate knowledge of farming problems, and a maturity of thought that was ripe for application to the job in hand.

Dr. Neatby's task in Science Service was to get more good research done and he applied himself to this with tremendous energy. He knew that you cannot build a scientific organization overnight—that it is necessary first to have men with sufficient training who have an enthusiasm for their work. Then you provide them with adequate facilities and hope for the best. After that, you can do little more than show an appreciation for work well done and give moral support to any who may find the going hard and frustrating. This is the basis on which he worked and the Science Service of today is a distinctive monument to his leadership.

Many honours came to Dr. Neatby in his career, among them being an LL.D. from the University of Saskatchewan in 1948 and a D.Sc. from the University of Manitoba in 1956, and fellowships from the U.S. National Research Council in 1933, the Royal Society of Canada in 1947, and the Agricultural Institute of Canada in 1949.



KENNETH W. NEATBY

Many regretted the arbitrary separation of the research workers in the Department of Agriculture into the two services—Experimental Farms Service and Science Service. Dr. Neatby was among those who worked consistently to bring about an amalgamation of the services but stonewall opposition prevented any action until changes took place in 1956. He gave the problem much thought, however, in the years that he was Director of Science Service. He held discussions with research workers in the two services and prepared preliminary plans. When conditions were right for amalgamation, the Deputy Minister of Agriculture called on Dr. Neatby to lead the way in planning and to head the new organization as Assistant Deputy Minister (Research). It is a great tragedy that Dr. Neatby did not live to see his plans come to fruition. He did, however, have the satisfaction of knowing that the new organization would be a reality and that he had been the prime mover in getting it under way. We can only hope that progress in the Research Branch will be a credit to the memory of the man who did so much to give it birth.

Dr. Neatby is survived by his wife, Janet, and one son, Andrew Mills, aged nine.

C. H. GOULDEN

John Kellock Robertson

1885—1958

JOHN KELLOCK ROBERTSON was born at Perth, Ontario, on January 2, 1885. The youngest of four children and the only son, he was a fourth generation Canadian with Scottish ancestry on both sides of the family. His father, Hugh Robertson, was an accountant with a Scottish love of learning. His mother's maiden name was Agnes Alicia Kellock. His most outstanding qualities of integrity, sincerity, and deep interest in education can be traced directly to the atmosphere in his childhood home.

J. K. Robertson matriculated from the Collegiate Institute at Perth with first class honours not only in mathematics and physics but also in classics and English. These gained for him three scholarships—in mathematics, classics, and general proficiency—with which he entered the University of Toronto in 1903. He graduated with the Honours B.A. degree in physics and mathematics in 1907 and with the M.A. degree in physics in 1908, the latter after working with Professor J. C. McLennan.

In 1909 while continuing to work as a research student and demonstrator at the University of Toronto, Robertson made what he regarded as the greatest decision of his life. Faced with the choice between a fellowship at Columbia University, New York, and a lectureship in physics at Queen's University, he chose the latter and, with only two brief interruptions, remained on the staff at Queen's until 1951. In 1912 he entered Emmanuel College, Cambridge, as a research student, and for a year worked in the Cavendish Laboratory under Sir J. J. Thomson. The influences of Cambridge University and Thomson were enduring. Robertson always remembered his Cambridge days with much pleasure, and he maintained a high regard for British education. Having an abiding admiration for Thomson, he often utilized the electrodeless method pioneered by Thomson for the spectroscopic study of electrical discharges in gases and vapours. In 1933–4 he was Visiting Professor at the Imperial College of Science and Technology, South Kensington, London, where he worked in the spectroscopic laboratory of Professor A. Fowler. Except for these two interludes, Professor Robertson devoted his energies continuously for forty years to teaching, research, and writing at Queen's University, which with its Scottish traditions strongly appealed to him. Rising in the academic ranks, he became Associate Professor in 1920, Professor in 1926, and Head of the Department of Physics in 1943 when Dean A. L. Clark retired. On his retirement from teaching in 1951, Queen's conferred on him the honorary degree of LL.D. and the title of Emeritus Professor.

In 1926 Robertson was elected Fellow of the Royal Society of Canada. He served as Secretary of Section III for six years (1935–41) and as President of that Section in 1942–3. In 1944–5 he held the highest office of the Society, that of President. In 1953 he represented the Royal Society of Canada at the Coronation.

As a teacher, Professor Robertson will long be remembered by many generations of students. He had the gift of lucid expression, and his patient explanations of difficult topics were prompted by a sympathetic understanding of the difficulties experienced by students. They will also recall with pleasure his quiet enthusiasm and dry humour. He was particularly interested in physical optics and in radiological physics. Out of his lecture courses came two well-known textbooks. His *Introduction to Physical Optics*, first published in 1929, was followed by three revised editions, the last appearing with the title *Introduction to Optics—Geometrical and Physical* in 1954. He was justifiably proud of his course in radiological physics given to medical students at Queen's. This course must have been unique in North America for many years. It began in 1920 as a second course in physics, taken by all second year medical students on a six year programme. After a groundwork of general physics in the first year, the second year course was devoted to such topics as the principles of electricity and magnetism, their applications to high voltage devices for the production of X-rays, high frequency circuits, production and physical properties of X-rays, and radioactivity; to which in the later years were added radioactive isotopes and an introduction to nuclear physics. As a result of his lectures to medical students, Robertson wrote two textbooks: *X-rays and X-ray Apparatus* in 1924, and *Radiology Physics* in 1941, followed by revised editions of the latter in 1948 and 1956.

Professor Robertson's notable contribution to medical education was suitably recognized both in Canada and in England. The Canadian Association of Radiologists elected him to Honorary Membership in 1951. His last class of medical students at Queen's University, "Meds. '55," made him an honorary member of their class. He valued this simple honour highly and made a point of returning from London to Kingston in time to be present at their graduation.

Notwithstanding heavy teaching duties, Robertson conducted research and directed post-graduate students. His contributions to the journals of physics cover a range of topics: theory of optical instruments of high resolving power such as the Fabry-Perot étalon; measurement of the half-width of a spectral-line source; limit of resolution of overlapping diffraction images; index of refraction of a thin film; intensity measurements of spectral lines; spectrum and excitation properties of active nitrogen; spectroscopic investigations of mercury, cadmium, zinc, and iodine vapours excited by high frequency discharges of various types; and patterns of wall deposits resulting from electrical discharges in carrier gases.

Robertson's writings were not confined to the technical aspects of physics for serious students. His lectures, articles, and books—whether addressed to the Royal Society of Canada or to the intelligent layman—dealt with such subjects as the historical and philosophical aspects of science, the relation of science to society, and popular science. For the Royal Society of Canada there were his Presidential Address "Continuity

JOHN KELLOCK ROBERTSON

and Discontinuity" and his address on "Science and Reconstruction in Canada" during the Second World War. His articles also graced the pages of *Queen's Quarterly*, on the editorial board of which he served during the period 1932–51. The titles of these: "New Light on the Structure of Matter," "The Nature of Light Emission," "Pure Science and the Humanities," "Theology and the New Physics," "Is Science Guilty?" "Science in Literature," and "Fission and Fusion," indicate his scope of interests. For the layman he wrote *Atomic Artillery* in 1937, which was expanded in 1945 to *Atomic Artillery and the Atomic Bomb*. For high school students of Ontario, he and Dr. R. C. Dearle wrote *A Senior Physics for High School* in 1945. In 1932 he wrote *Tayville*, a series of sketches about life and people in an Ontario town "Tayville," indentifiable with Perth at the time of his boyhood. On his return from England in 1934 he wrote a series of sketches called *Three Canadians in London*.

On June 2, 1915, J. K. Robertson married Ethel Georgene Minnes, elder daughter of the late James Minnes of Kingston. Their only child, Ethel Lorraine, after graduating from Queen's University went to live in England. Mrs. Robertson died in February, 1951. After his retirement from Queen's University, Robertson took up residence in Hampstead, London, England. His return visits to Kingston were, however, frequent and lengthy.

In London a new but no less active life began for him. He was a Member of the Royal Institution of Great Britain, a Fellow of the Institute of Physics, an Honorary Member of the Hospital Physicists' Association, and an Honorary Member of the British Institute of Radiology. His life was filled with the pleasures of attending evening discourses on science in London, of meeting English and overseas scientists, and of attending scientific conferences. In recognition of his contribution to medical education, the British Institute of Radiology invited him to give the thirty-third Silvanus Thompson Memorial Lecture on April 29, 1954. His address, entitled "An Experiment in Medical Education," dealt, of course, mainly with his teaching of physics to medical students at Queen's University in the period 1920–51.

Appointed in 1951 by the National Research Council of Canada to the Advisory Committee of its London Office, Robertson attended as an official Canadan delegate many scientific conferences in Europe. These were the General Assembly of the International Council of Scientific Unions (Amsterdam, 1952), Institute of Physics Meeting (Nottingham, 1954), Hospital Physicists' Association Meetings (Amsterdam, Manchester, Leeds, and Newcastle, 1954), Conference on Physics of the Ionosphere (Cambridge, 1954), Seventh International Astrophysical Symposium (Liège, 1956), Symposium on X-Ray Microscopy and Microradiology (Cambridge, 1956), General Assembly of the International Union of Pure and Applied Physics (Rome, 1957) as leader of the delegation, and the International Colloquium on Optics in Metrology (Brussels, 1958).

Professor Robertson died suddenly in London on June 24, 1958. His many friends will remember him with admiration and affection.

B. W. SARGENT

Sidney Earle Smith

1897–1959

THE death on March 17, 1959, of the Honourable Sidney Earle Smith, the Secretary of State for External Affairs and a Fellow of the Royal Society of Canada since 1950, ended with tragic abruptness a career of fine accomplishment which, after thirty-six years of university work, gave lively promise of yet another chapter of achievement in Commonwealth and foreign affairs.

Sidney Smith was born at Port Hood, Cape Breton, and throughout his life his voice retained some of the soft persuasive tones of that island. With his family background and tradition, it was inevitable that his ability, energy, and ambition should carry him to the university. From King's College, then at Windsor, he graduated successively as B.A. and M.A. He followed the well-worn path to the Dalhousie Law School where, with high honours, he won his LL.B. His university course was interrupted by a period of army service in the First World War. He was admitted to the Nova Scotia Bar in 1921.

The first chapter of his professional career, 1921–34, was devoted to the teaching of law. He was appointed Lecturer and later Assistant Professor in the Dalhousie Law School and was soon recognized as a sound teacher with great capacity for devoting himself without stint to his work, with a disposition towards reflection which raised his comprehension of law above the cases and the statutes, and with a geniality and natural kindliness which drew others to him.

From 1925 to 1929, he was Lecturer at Osgoode Hall, Toronto. Then followed five years as Dean of the Dalhousie Law School where he renewed old friendships and developed new enthusiasms. That was a period in all universities when administration was an almost desperate holding operation, when the force of the depression made new ventures impossible. Nevertheless, he strengthened the fine traditions of the School and added liveliness to its soundness.

He had in 1926 happily married Harriet Rand whose loyalty, charm, and good judgment were to strengthen and assist him through the rest of his life.

It was in 1934, when relief from the depth of the great depression was not discernible to any but the most careful statistician, that he accepted the appointment as President of the University of Manitoba which he was to hold for ten years. He shouldered a heavy and difficult responsibility for there had been lamentable chapters in the recent history of that University which would have made his task formidable even had there been no depression. He brought to Manitoba optimism and hope, an extraordinary patience, and a spirit of friendly concern for the interests of all his colleagues. He coped with many diverse elements and the thorny problem of establish-

ing vitality and cohesion on a new site still bitterly contested. He won wide support for the University in the city and province and was able to attract to it fresh and able talent in E. K. Brown, Robert McQueen, and others.

He himself gained greatly from the intellectual atmosphere of Winnipeg. John W. Dafoe was at the peak of his prestige and influence and as Chancellor of the University drew him into the discussions, forays, and friendships for which Winnipeg of that day was famous. The University of Manitoba felt bereft when, in 1944, he accepted the position of Principal of University College, Toronto, as a preparatory step to assuming the presidency of that University in 1945.

Here, too, he faced difficult and unusual problems though of entirely different sorts. The University was much larger than any he had experience of. It had the unfamiliar problems of a federated institution. He was confronted by the need, not for retrenchment but for rapid expansion to cope first with the return of ex-service students and later with expansion on a permanent basis to serve an enlarged population and meet the higher requirements of the post-war Canada for scholarship and scientific research. Among his distinctive and cherished achievements were the establishment of the new general course in Arts, the re-organization and expansion of the School of Graduate Studies, and the initiation of the major increase in academic salaries which reaches its third and completing phase this year. Though his route to results might at times be indirect and complicated, he never lost sight of the fact that the crowning achievement of a university president is to attract able men and make possible an environment which will stimulate their highest talents. The respect and affection in which his colleagues held him were shared by the heads of other universities throughout the country, who were warmed by his frankness and friendliness and respected the underlying firmness which characterized him.

In September 1957, he accepted the invitation of the Prime Minister of Canada to join his Cabinet as Secretary of State for External Affairs. He had for long had an interest in political life and some inclination to try his hand. When he was at Manitoba, he was tempted by suggestions that he should stand for leadership of the Conservative Party but refused to entertain such proposals so long as there was any possibility that Premier Bracken of Manitoba would be a contestant. When the opportunity to join the Cabinet came, he accepted it willingly. He had some feeling that in thirteen years he had completed his best work at the University of Toronto and a final chapter in political life challenged and tempted him.

It was all done with great and unnecessary speed. Before he was well out of the University of Toronto, he was in the Assembly of the United Nations and very quickly in the unfamiliar atmosphere of the House of Commons. He had had no experience of the working of the Civil Service and no direct knowledge of the complicated mechanics of government. The time was so short that he was inadequately briefed. For a period he appeared to falter. Obviously it is impossible for any political novice to settle into a department,

SIDNEY EARLE SMITH

get himself elected in an unfamiliar constituency, absorb the atmosphere of the House of Commons, and understand the complicated patterns and pressures of the United Nations in a matter of a month or six weeks. The atmosphere of a university should be, and usually is, one of friendly collaboration in achieving common interests. Certainly this was the atmosphere which Sidney Smith tried to achieve. The daily climate of both domestic and international politics is vastly more contentious and complicated. Collaboration there undoubtedly is, but it is streaked by a multitude of pressures, personal ambitions, vested interests, and traditions not readily unravelled by the newcomer.

In the event, Sidney Smith called on his great resources of industry and whole-hearted concentration on a job. He recognized his difficulties and faced them with great courage. Month by month his integrity and objectivity made themselves felt. He had moved forward to a position in which he once more had command of his resources and was in a position to lead. Death overtook him unannounced but not before he had given clear evidence of the hard won competence he had achieved in his new post.

He will be warmly remembered by the Fellows of the Royal Society for his distinguished achievements and friendships in three universities and as a Minister of the Crown, but he will be remembered even more warmly for his picturesque and homely language, for his open friendliness, for his willingness at all times to learn the elements and the limitations of his job, for his encouragement of good teaching and for the help he sought to give to scholars of talent who were willing to apply themselves, for his frequent commendation of individualism and nonconformity, and for his stalwart support of academic freedom and the dignity of learning.

W. A. MACKINTOSH

Osman James Walker

1892–1958

DR. OSMAN JAMES WALKER, Emeritus Professor of Chemistry at the University of Alberta, died suddenly of a heart attack on September 9, 1958, at the age of sixty-six. Although he had retired from his administrative duties a year previously, and had been in failing health for some time, he was still active and was preparing to teach a course in Industrial Chemistry during the session 1958–9.

Dr. Walker was born at Portage la Prairie, Manitoba, on July 23, 1892, and was brought up on a farm in the North Battleford area of Saskatchewan. After graduating from the University of Saskatchewan in Honours Chemistry, he took his Master's degree at Harvard and entered McGill as a National Research Council Fellow in 1917. On completing his Ph.D. work in 1920 he came to the University of Alberta as an Assistant Professor. In 1934 he was appointed full Professor and in 1942 became Head of the Department of Chemistry, in which capacity he continued until his retirement. In 1952 he took on the additional responsibility of Director of the School of Graduate Studies. This school grew so rapidly that on Dr. Walker's retirement it was raised to the rank of a Faculty with a full-time Dean.

In spite of this heavy administrative load, Dr. Walker managed to continue his researches in analytical chemistry. He carried out investigations on the distribution of iodine in Alberta waters, in relation to goitre, and on fluorine in relation to mottled enamel of teeth. He was interested in the occurrence of selenium and manganese in soils, grains, and plants, and also in such industrial problems as the acceleration of vulcanization in rubber and the corrosion of cobalt-chromium alloys by commercial cleaning agents. His best-known work was that on fluorine in drinking water, and he was a firm supporter of fluoridation of water supplies which are naturally low in fluoride content. Unfortunately his efforts did not succeed in overcoming local prejudice and Edmonton is still without fluoridation.

During the Second World War, Dr. Walker carried out research for the Canadian Chemical Warfare Group on the preparation of screening smokes and on flame-thrower fuels.

Dr. Walker's ability as a chemist was widely recognized. He was a Fellow of the Chemical Society and of the Chemical Institute of Canada, as well as of the Royal Society of Canada, and was a member of the Technical Advisory Committee of the Research Council of Alberta. Just before his retirement he was made President of the Chemical Institute of Canada, and during his tenure of office he travelled right across Canada on a speaking tour of the branches.

Dr. Walker (or "O.J.," as he was familiarly known by a host of friends and acquaintances) will be remembered with affection by great numbers of his old students scattered across the continent. On committees and Faculty Councils, his sound judgment on controversial points and his unassuming friendliness of manner endeared him to his colleagues. When the Faculty Common Room Association was founded, Dr. Walker was the natural choice for the first President.

For many years Dr. Walker was an active badminton player, and even after his heart condition required him to give up strenuous physical exercise he liked to organize round-robins for the Faculty Badminton Club. He loved the mountains and the outdoors. His cottage on Lake Edith in Jasper Park was a constant joy to him, and many of his friends cherish happy memories of the parties he liked to hold there in the Fall.

In 1918, Dr. Walker married Ella May Jacoby, a music teacher who later became widely known as a painter, sculptor, and writer. She is the author of *Fortress North*, a novel dealing with the early history of Edmonton. Mrs. Walker and their two sons, Osman James Jr. and Wilfred, survive O.J.

E. S. KEEPING

APPENDIX C

TITLES AND ABSTRACTS OF PAPERS PRESENTED AT THE ANNUAL MEETING

PROGRAMME OF PAPERS

SECTION I. LITTÉRATURE, HISTOIRE, SCIENCES SOCIALES, ETC.

1. Evolution de l'enseignement : 1910–1935. La querelle de l'instruction obligatoire. Par Louis-Philippe Audet, M.S.R.C.

L'une des questions les plus vivement débattues, parce que souvent mal posée. Préludes : attitude de Mercier en 1881 ; de M. F. Hackett en 1892 ; projet de loi de Tancrède Boucher de Grosbois en 1901. En 1912, le professeur J. A. Dale de l'université McGill a proposé au Comité protestant de l'Instruction publique que la fréquentation scolaire soit obligatoire pour les enfants protestants : ce fut le signal de la bataille qui se continua en 1913 et qui atteignit son apogée en 1918–19. Rôle de Godefroy Langlois, T.-D. Bouchard, Lomer Gouin, C. J. Magnan, Irving O. Vincent, des journaux (*Le Clairon*, *Le Pays*, etc.). Batailles de statistiques. Epilogue : la loi de 1942 : S.E. le cardinal J. M. R. Villeneuve.

2. Evolution de l'enseignement : 1910–1935. Les Collèges classiques : externats classiques et collèges classiques féminins. Par Louis-Philippe Audet, M.S.R.C.

Les collèges classiques continuent à se multiplier durant ce quart de siècle : 7 collèges étaient affiliés à l'université Laval de Québec en 1910, 11 nouveaux viendront s'ajouter bientôt de 1910 à 1935, dont trois collèges classiques féminins (Sillery, Nicolet, Trois-Rivières).

A Montréal, la situation est fonction des relations avec l'université Laval : 11 collèges, la plupart existant depuis plusieurs années, déjà, sont affiliés en 1922 ; puis l'on voit apparaître une nouveauté, l'*externat classique*, en 1929 et 1930 et, du côté des filles, le collège classique féminin avec la fondation du Collège Marguerite-Bourgeoys en 1908 (affilié en 1922) et celle du Collège Saint-Maurice de Saint-Hyacinthe en 1935. L'épopée des collèges classiques féminins ; les préjugés. Les besoins du mileu. Les programmes.

3. La vie politique du Québec de 1910 à 1935. Par Jean-Charles Bonenfant, M.S.R.C.

L'histoire politique de la province de Québec pendant le quart de siècle qui s'est écoulé de 1910 à 1935 est dominée par la puissance intangible du parti libéral qui, sous la direction successive de deux chefs, Lomer Gouin et Alexandre Taschereau, ne se sentit jamais vivement menacé. Affaibli pour des raisons de politique fédérale, ayant après 1911 profondément déçu les nationalistes, le parti conservateur provincial ne réussit jamais à cristalliser les sentiments d'opposition qui naissaient au gré des événements.

De plus, au lendemain de la guerre 1914–18, le gouvernement au pouvoir dans le Québec profita de l'épanouissement de la juridiction provinciale, et seule la crise économique réussit au bout de quelques années à ébranler la structure d'un parti vieillissant.

4. Difficultés d'entente nationale (1910 à 1935). Par Mgr Arthur Maheux, M.S.R.C.

Les principales difficultés découlent d'événements historiques antérieures à 1910. Elles portent sur la contribution, en argent, en hommes, en armes, en navires, aux guerres où l'Angleterre se trouverait engagée. Elles concernent l'attitude du Canada envers l'Empire,

les nationalistes réclamant l'autonomie, d'autres voulant une étroite sujétion. La question des écoles dans l'Ouest et dans l'Ontario passa à l'état de crise, notamment avec le règlement Dix-Sept en Ontario. Enfin, il y eut notable mésentente sur la façon d'interpréter le texte de la loi organique du pays, c'est-à-dire l'Acte de l'Amérique britannique du Nord, communément appelé Confédération.

5. La littérature d'une guerre à l'autre. Par Guy Sylvestre, M.S.R.C.

Grâce à l'exemple des membres de l'Ecole littéraire de Montréal, les écrivains canadiens de langue française s'émancipent peu à peu de contraintes excessives et font admettre progressivement la littérature comme un des beaux-arts. Tant au point de vue des sources d'inspiration qu'à celui de la langue à employer, deux écoles s'opposent et, par réaction l'une contre l'autre, tombent souvent dans des excès : régionalisme trop particularisé ou exotisme déraciné. Une prise de conscience de plus en plus profonde de leur condition s'opère chez les écrivains qui se découvrent des *Britanniques* parlant *français* sur le continent américain. La qualité littéraire des œuvres s'améliore en même temps que le goût du public.

6. Plutarque et la biographie moderne. Par Maurice Lebel, M.S.R.C.

Plutarque : conception, sources et méthodes des biographies parallèles. Originalité de Plutarque. Dette des biographes contemporains à Plutarque. Popularité de la biographie artistique et littéraire au XX^{e} siècle dans les pays suivants : Allemagne, Autriche, Belgique, Canada, Etats-Unis, France, Grande-Bretagne, Grèce, Italie, Russie, Suisse. Essai de comparaison et d'appréciation.

7. Une victoire de l'homme sur la nature. Par Benoît Brouillette, M.S.R.C.

Les victoires de l'homme sont nombreuses dans la prairie canadienne. Une des plus récentes acquisitions, due à la persévérance d'un fermier d'Alberta, est celle d'une graminée vivace, le Lolium pérenne, dont l'usage en se généralisant pourrait modifier et peut-être transformer l'économie agricole de la prairie.

Jusqu'ici, les seules Graminées introduites dans l'Ouest, pour créer des prairies artificielles, sont celles acclimatées aux pays humides de l'Est, notamment l'Agropyrum ou petit chiendent. Le Lolium ou fausse ivraie, d'origine sibérienne, lui serait bien supérieure. Mais on n'avait pas réussi à le faire se reproduire aisément hors des fermes expérimentales. En 1958, après quatre années de vains efforts, un cultivateur de Claresholm, en Alberta, vient d'obtenir une récolte extraordinaire dont l'acclimatation progressive ne manquera pas de modifier les paysages des régions les plus arides de la prairie.

8. Une loi municipale singulière (1840). Par Louis-Philippe Audet, M.S.R.C.

C'est lord Sydenham qui promulgua le 9 décembre 1840, la première loi municipale qui figure dans les Statuts de la province du Bas-Canada. Loi arbitraire qui place tout le système sous l'autorité du Gouverneur et supprime à peu près toute initiative locale et une saine liberté d'action.

Choix des préfets de districts par Sydenham : dans une province presque exclusivement française, les deux-tiers de ces officiers étaient d'expression anglaise. Place des chefs-lieux : appréciation de A. N. Morin.

Loi destinée à servir de cadre et à préparer la nouvelle loi scolaire de 1841.

9. La première loi scolaire sous l'Union (1841). Par Louis-Philippe Audet, M.S.R.C.

Privé de loi scolaire depuis 1836, le Bas-Canada avait un urgent besoin que le Parlement des Canadas-Unis statua sur cette question. Sydenham prépara sa loi scolaire par l'ordonnance sur les Conseils municipaux et par une campagne de presse habilement menée par l'avocat montréalais Charles Mondelet.

La loi devant les Chambres : vigoureuses protestations du clergé catholique : rôle d'Etienne Parent et du journal *Le Canadien*. Le texte de la loi (25 articles). La loi de 1841 et les lettres de Mondelet : aspects financier, administratif et pédagogique.

Conclusions : rôle prépondérant des Conseils de Districts et influence à peu près nulle des Commissaires d'écoles.

10. Christophe Colomb et sa découverte. Par Claude Melançon, M.S.R.C.

Les Canariens prétendent que c'est dans leurs Iles que Colomb a trouvé ou reçu l'aide efficace que lui a permis de réaliser son audacieux projet. La chronique locale qui s'appuie sur une lettre encore inédite et des preuves de circonstances veut prouver que Colomb s'est approprié frauduleusement la carte de Sanchez de Huelva qui lui donna la route sur le 28e parallèle et que le revirement d'opinion de la cour d'Espagne en sa faveur est due en partie à cette carte, mais surtout à l'influence de sa maîtresse Dona Beatriz de Bobadilla.

SECTION II. ENGLISH LITERATURE, PHILOSOPHY, SOCIAL SCIENCES, ETC.

Summary of Programme

Monday, June 1

10.00 A.M. (1) General meeting of the Society.
(2) General symposium on Evolution.

2.00 P.M. (1) Business meeting of the Section.
(2) Symposium on Eighteenth-Century Thought.
(*a*) Adam Smith. By V. W. Bladen, F.R.S.C. (Presidential address).
(*b*) Francis Hutcheson and the "Moral Sense" Theory. By A. H. Johnson, F.R.S.C.
(*c*) Edmund Burke. By C. B. Macpherson, F.R.S.C.

Tuesday, June 2

9.30 A.M. (1) Round Tables.
(*a*) Recent Trends in the Economic History of the Renaissance. By W. K. Ferguson, F.R.S.C.
(*b*) Edward the Confessor in History. By T. J. Oleson, F.R.S.C.

2.00 P.M. (1) Business meeting of the Section.
(2) Round Tables.
(*a*) Organizing the Humanities. By Watson Kirkconnell, F.R.S.C.
(*b*) Further Report on Excavations on the North Shore of Lake Superior. By T. F. McIlwraith, F.R.S.C.
(*c*) Dating of Some Museum Objects by Metallurgical Means. By K. Winterton. Presented by G. F. G. Stanley, F.R.S.C.

Wednesday, June 3

9.30 A.M. (1) Section symposium on Evolution.
(*a*) Samuel Butler and Evolution. By C. T. Bissell, F.R.S.C.
(*b*) Evolution and the Social Sciences. By A. Brady, F.R.S.C.
(*c*) Evolution and Anthropology. By H. B. Hawthorn, F.R.S.C.

2.00 P.M. General meeting of the Society.

Francis Hutcheson and the "Moral Sense" Theory. By A. H. Johnson, F.R.S.C.

Hutcheson's "moral sense" theory is examined in the context of his opposition to egoistic and rationalistic approaches to morality. The "approving," "perceiving," and "motivating" functions of moral sense are discussed. His use of the "greatest happiness of the greatest number" principle is noted. Hutcheson's relations to Adam Smith and other leading figures of the time are briefly discussed. Some major criticisms of Hutcheson's theory are considered.

Recent Trends in the Economic History of the Renaissance. By Wallace K. Ferguson, F.R.S.C.

In scarcely any other field of Renaissance studies have there been as radically new developments in method and interpretation as in Economic History. It is the purpose of this paper to trace some of the recent trends and to evaluate their significance for the interpretation of Renaissance culture. Special attention will be given to the development of business history, to the introduction of statistical research and quantitative criteria, and to the attempt to establish long term economic trends. The conclusion is that the period of the Italian Renaissance was one of economic stagnation or decline.

Organizing the Humanities. By Watson Kirkconnell, F.R.S.C.

In a chapter from an impending volume of memoirs, the author recalls the stages by which the Humanities Research Council of Canada came into being. As chairman of the Royal Society's special humanities committee in 1942, of its committee to organize the Council in 1943, of the Council itself in 1943–7 and of the Council's survey committee in 1944–6, he has drawn on his own voluminous files for the inside story of these formative years. The Humanities Research Council was in a real sense the child of Section II of the Royal Society of Canada and was born in the darkest days of World War II, when some unimaginative civil servants came within a narrow margin of closing out the humanities in Canada's universities. The parts played by the Canadian Social Science Research Council, the American Council of Learned Societies, and the Rockefeller Foundation are also made clear.

Dating of Some Museum Objects by Metallurgical Means. By. K. Winterton. Presented by George F. G. Stanley, F.R.S.C.

Metal articles of varying antiquity, including items from the Beardmore collection, have been examined in order to provide data for the determination of a probable date and place of origin. Various non-destructive physical and metallurgical testing methods have been applied, by means of which the type of material used and the method of working have been established. This information permits deductions about approximate date and location of manufacture. In cases where the facts are not historically well established, the metallurgical approach alone does not yield results of great accuracy. The methods employed should be regarded as providing additional information in cases where doubt exists.

SECTION III. MATHEMATICAL, CHEMICAL, AND PHYSICAL SCIENCES

Summary of Programme

Monday, June 1

10.00 A.M. Business Meeting of the Society.

11.00 A.M. General Meeting of the Society.

2.00 P.M. Business Meeting of Section III.

3.00 P.M. Presidential Address and invited papers.

Tuesday, June 2. Sub-section meetings as follows:

9.00 A.M. Chemistry, papers 4–9.

9.00 A.M. Meteorology, papers 10–16.

2.00 P.M. General Physics, papers 17–22.

2.00 P.M. Mathematics, papers 23–28.

Wednesday, June 3. Sub-section meetings as follows:

9.00 A.M. Spectroscopy, papers 29–35.

9.00 A.M. General Physics, papers 36–42.

2.00 P.M. Business Meeting of Section III.

4.00 P.M. Business Meeting of the Society.

8.00 P.M. Joint Symposium with Canadian Association of Physicists on Cosmology.

Monday, June 1

2.00 p.m.—Business Meeting of Section.

3.00 p.m.—Presidential Address and invited papers.

1. Physica: heri, hodie, cras. By G. M. Shrum, F.R.S.C.
2. Plasma Physics. By R. F. Post
3. The Evolution of Intelligent Automata. By A. Porter

CHEMISTRY

Tuesday, 9.00 a.m. Papers 4–9

4. Radiolysis of Halogen-Substituted Acetic Acids By R. J. Woods and J. W. T. Spinks, F.R.S.C.

Acid products are formed when aqueous solutions of the halogen-substituted acetic acids are irradiated wih cobalt-60 gamma rays. The yield of these products is discussed in relation to the structure of the acids.

5. The Infrared Spectra of Malonate Esters. By R. A. Abramovitch. Presented by J. W. T. Spinks, F.R.S.C.

The spectra of malonate esters in the carbonyl stretching region are shown to be complex. Liquid films or solutions of the esters exhibit two carbonyl stretching bands at the slit widths commonly used in qualitative runs. The splitting of the carbonyl absorption band has been shown not to be owing to either enolization and conjugate chelation or association. In the absence of rotational isomerism vibrational coupling is possible between the two carbonyl groups. At narrower slit widths four or more poorly resolved bands are observed (liquid films) and these show some slight temperature effect. It is suggested that in the open chain esters two (or more) rotational isomers can exist and that vibrational coupling can occur in each of the forms.

6. Radiation Induced Addition of HBr to C_2H_4. By D. A. Armstrong and J. W. T. Spinks, F.R.S.C.

Detailed kinetic studies have been made of the radiation induced addition of HBr to C_2H_4 in the gas phase to form ethyl bromide. The reaction is a chain reaction with an ion pair yield of about 10^3. Results obtained in additional experiments performed at liquid nitrogen and liquid oxygen temperatures support a free radical reaction mechanism.

7. Capacité calorifique des solutions binaires de $H_2O-H_2O_2$ et $D_2O-D_2O_2$. Par Paul A. Giguère, M.S.R.C. et J. L. Carmichael.

Au moyen d'un calorimètre isotherme à éther de phényle (26.9° C) on a mesuré les capacités calorifiques moyennes jusqu'à 45° et 60° C de solutions binaires de peroxyde d'hydrogène dans l'eau et de peroxyde de deutérium dans l'eau lourde à diverses concentrations. La capacité calorifique d'excès décroît à mesure que la température s'élève et l'effet maximum passe de 25 mole pour-cent de peroxyde à 26.9° C, à 10 pour-cent à 45°. Les chaleurs de dissolution calculées à partir des nouvelles données s'accordent, à la précision des mesures près, avec les valeurs déduites des pressions de vapeur de ces mélanges. Pour les composés deutérés la capacité calorifique d'excès est plus grande que pour les composés hydrogénés de quelque 13 pour-cent. Cet effet semble trop considérable pour s'expliquer seulement d'après l'énergie plus grande de la liaison deutérium.

8. Ion-Pair Returns in the Solvolysis of 2-Phenylethyl-1-C^{14} Tosylate. By C. C. Lee. Presented by K. J. McCallum, F.R.S.C.

Acetolysis and formolysis of 2-phenylethyl-1-C^{14} tosylate were interrupted before completion. All samples of 2-phenylethyl tosylate recovered from the reaction mixtures showed rearrangement of the C^{14}-labeled atoms from the C-1 to the C-2 positions, indicating the occurrence of return to covalent bonding through the intermediate ethylphenonium ion or its equivalent. The presence of lithium perchlorate reduced the extent of return. Solvolysis in the presence of sodium tosylate-S^{35} made possible the simultaneous determinations of C^{14} rearrangement and S^{35} exchange in the recovered 2-phenylethyl tosylate. Consideration of such data pointed to the occurrence of both external and internal returns involving the ethylphenonium tosylate ion-pair.

9. Syntheses of 5-Alkyl-2, 4-Thiazolidinedione-2-Azines and 5-Alkyl-2, 4-Thiazolidinedione-2-Dimethylhydrazones. By Paul E. Gagnon, F.R.S.C., Jean-Louis Boivin, and Gordon M. Brown.

A series of 5-alkyl-2, 4-thiazolidinedione-2-azines was prepared by treatment of substituted thiocyanoacetates with hydrazine hydrate. Their structure was well established by hydrolysis with hydrochloric acid which gave alkyl thiazolidinediones and hydrazine hydrochloride. When dimethylhydrazine was used instead of hydrazine as reagent, 5-alkyl-2,4-thiazolidinedione-2-dimethylhydrazones were obtained.

METEOROLOGY

Tuesday, 9.00 a.m. Papers 10–16

10. The Thermal Structure of Cyclonic Weather Systems. By C. M. Penner. Presented by Andrew Thomson, F.R.S.C.

The upper air thermal structure of cyclonic storms is generally very complex. Well-developed storms exhibit, in many cases, three distinct baroclinic zones separating four air masses. The polar-front theory which attempts to describe the thermal structure in terms of two air masses and one baroclinic zone is quite inadequate. The structure of a typical January cyclone is illustrated with the use of upper air cross-sections, thermodynamic diagrams, and wind-shear hodographs.

11. Canadian Experiments in Numerical Weather Prediction. By W. L. Godson, T. J. G. Henry, and M. Kwizak. Presented by Andrew Thomson, F.R.S.C.

In many countries use is made of electronic computers in the solution of the physical equations appropriate to the behaviour of the atmosphere. Preliminary experiments have been carried out in Canada along these lines, and development in this field as well as results of our studies now suggest that these activities should be greatly accelerated. The physical bases for this decision, and the Canadian studies in this field, will be reviewed briefly.

12. The Rapid Warming Phenomenon of the Arctic Stratosphere in early 1959. By W. L. Godson. Presented by Andrew Thomson, F.R.S.C.

Although it is now realized that the transition from the winter Arctic stratosphere to the summer Arctic stratosphere is customarily extremely abrupt, this phenomenon never fails to attract considerable interest and curiosity. This year it occurred in the first week of March, although it has occurred as early as the first week of January (in 1955). The evolution of the thermal and dynamic state of the Arctic stratosphere in early 1959 will be described, and comparisons made with earlier years.

13. An Experimental Study of the Freezing of Supercooled Water Drops. By R. H. D. Barklie, N. R. Gokhale, and J. S. Marshall, F.R.S.C.

An array of supercooled water drops of the same size, of any given degree of purity, maintained at a constant temperature exhibits reproducible behaviour summarized in the curve relating number of drops frozen to time. The same array of drops may be melted and refrozen a number of times. Under these conditions the order in which droplets freeze changes from one cycle to another although the curve of number frozen against time remains unchanged. This evidence supports the view that the freezing process is random and the constant temperature method demonstrates the significance of time in the process.

Curves relating number of drops frozen to temperature at constant cooling rate are also obtained and are compared with those at constant temperature. Each method gives a value for the constants a and A in the equation

$$-\frac{\Delta N}{N} = A\,V(e^{(aT_0-T)}-1)\Delta t$$

where N is the number of drops unfrozen at time t, each of volume V and temperature T. These results may also be considered in the light of information available from curves relating V to T.

14. Snowfall Rates at Montreal. By K. L. S. Gunn. Presented by J. S. Marshall, F.R.S.C.

Time lapse photographs of the intercept of the snow surface on a sloping wire rod have been taken every six minutes throughout the winter. From this record the depth is measured to the nearest millimeter and rates of snowfall (R) determined with considerable precision as such rate measurements go. The number of hours with snowfall rate greater than R decreases exponentially with R, the decrease being a factor 4 for each 10 mm hr^{-1} (of snow) increase in R. Thus it never snows very hard in Montreal: only 2 per cent of the hours of snow are at rates greater than 30 mm of snow per hour.

15. Growth of Graupel and Hail. By R. H. Douglas. Presented by Andrew Thomson, F.R.S.C.

Growth rates of graupel and hail depend mainly upon the particle mass and cloud density, being relatively insensitive to the particle density. Typical low-density winter cloud favours sublimational growth of snow rather than accretional growth of graupel, although millimeter-sized graupel may develop in cold cumulus. For hail of centimeter size, denser cloud is necessary; in summer cumulus growth to this size can occur within the 15-minute interval which has been observed to elapse between the first radar detection of storms and the first appearance of hail at the ground.

16. A Synoptic Study of the 1958 Hail Season in Central Alberta. By C. E. Thompson and D. H. Smith. Presented by Andrew Thomson F.R.S.C.

The major hail activity of 1958 is tabulated and although a light year, 37 days are designated as hail days for the four months June to September.

An examination of many synoptic factors at the surface and the upper air discloses only a few significant differences between hail days and non-hail days. Major hail storms are produced by frontal activity and associated upper level jetting of winds. Vorticity methods show some promise.

Major hailstorms in Saskatchewan in 1958 were produced by factors similar to those in Alberta.

GENERAL PHYSICS

Tuesday, 2.00 p.m. Papers 17–22

17. Betatron Acceleration of Electrons in a Plasma. By H. M. Skarsgard. Presented by B. W. Currie, F.R.S.C.

Recently there has been interest in producing a high current pinched beam of relativistic electrons. One way in which to try to produce such a beam is to apply a strong betatron type accelerating field to an ionized gas or plasma contained in a toroidal vacuum chamber. For suitable plasma densities and sufficiently strong accelerating field it should be possible to accelerate large numbers of runaway electrons around the torus within the electrically neutral plasma. An air-cored betatron is proposed whose winding, in two halves above and below the plane of the orbit, is effectively a single turn made up of several turns connected in parallel and suitably arranged so as to give a betatron field. A longitudinal magnetic field is to be provided around the torus during acceleration.

18. An Electron Spin Resonance Spectrometer for Radiation and Biological Studies. By J. W. Hunt and W. B. Sampson. Presented by H. E. Johns, F.R.S.C.

A sensitive electron spin resonance spectrometer has been constructed for the detection of free radicals in aqueous solutions. The problems of detecting biological concentrations of free radicals and transient radicals in irradiated solutions will be discussed. Theoretical calculations will be given for the optimum size and shape of samples in a waveguide cavity.

Our spectrometer is a bridge type instrument operating at 9400 Mc/s. Magnetic field modulation and subsequent detection is at 450 Kc/s. The magnetic field is stabilized to one part in 10^4 by a transistor-controlled power supply.

Preliminary results on irradiated systems will be given.

19. Nuclear Quadrupole Resonance Spectra of B^{10} and B^{11} in Kernite. By G. M. Volkoff, F.R.S.C. and J. M. Rocard.

The nuclear quadrupole resonance spectrum of a nucleus with spin $I = 3$ has been investigated theoretically including the effects on the line frequencies and the relative signal strengths of the deviation of the crystalline electric field from axial symmetry, of the presence of a weak external constant magnetic field Ho, and of the orientation with respect to the crystal of the linearly polarized resonant radio frequency magnetic field H_1. The results are used to discuss several weak B^{10} ($I = 3$) lines observed in kernite in terms of information derived from earlier observations of the B^{11} ($I = 3/2$) spectrum in the same crystal.

20. An Iterative Method of Correcting for the Response of a Scintillation Detector Using an Automatic Computer. By L. D. Skarsgard, L. S. Green, and H. E. Johns, F.R.S.C.

The problem of correcting pulse height distributions of radiation spectra for the distortions produced in the scintillation crystal (NaI) and photomultiplier has been approached with an iterative procedure programmed for the automatic computer at the University of Toronto. The iterative approximations are used for both removing the statistical spread from the distribution and correcting for the incomplete energy absorption of some of the photons. These energy losses, as well as the resolution of the detector, were measured experimentally.

The system uses matrix multiplication with no matrix inversion, thus permitting the use of the greater spectral detail afforded by a multi-channel analyser. Large quantities of data may be processed rapidly with this method.

21. A Canadian All-Sky Camera for Auroral Research. By F. R. Park. Presented by D. W. R. McKinley, F.R.S.C.

One of the main objectives of the I.G.Y. auroral programme was the determination of the nature and extent of auroral displays over the whole earth at any given time. The all-sky camera is an instrument for automatically photographing the night sky from horizon to horizon for the purpose of recording visible aurora. A 35-mm all-sky camera was designed at the National Research Council and nine units were built and installed at selected Canadian I.G.Y. stations. A description is given of the design and operation of this instrument and some of the observational results are illustrated and discussed.

22. The Story of the Extraction of Helium from Natural Gas in Canada, 1915–20. By John Satterly, F.R.S.C. (ret'd).

In 1915, during World War I, the late Professor J. C. McLennan was asked by the British Admiralty to make a survey of the helium resources of the British Empire with a view to the extraction of helium for use in observation balloons and other dirigibles. The Professor immediately enlisted his staff. He toured the country collecting samples and the analyses were made in the Physics Building of the University of Toronto. Extraction plants were built at Hamilton and later at Calgary. As the Canadian natural gases contain only about 1/3 of 1 per cent of helium the problem was not an easy one, but at last 60,000 cu. ft. of helium were obtained of about 90 per cent purity. Although this gas was bottled too late for use in the war, it was used eventually by Professor McLennan when he liquefied helium in Toronto. Nearly all the staff employed in this project were members of the University of Toronto and Fellows of the Royal Society of Canada. It is deemed that a report of their efforts should be written before all the survivors have died.

MATHEMATICS

Tuesday, 2.00 p.m. Papers 23–28

23. Similarities over Fields of Characteristic Two. By Peter Scherk, F.R.S.C.

Let E denote a vector space over a field K of characteristic two. A mapping $x \to [x]$ of E into K is called a quadratic form if $[\lambda x] = \lambda^2[x]$ for all $\lambda \in K$, $x \in E$, and if $(x, y) = [x+y]+[x]+[y]$ is a bilinear form. Let $[x]^t$ be a second quadratic form. We consider i.a. the following statements:

(i) There is a $\rho \in K$ such that $[x]^t = \rho[x]$ for all $x \in E$.

(ii) $[x] = 0$ always implies $[x]^t = 0$.

Obviously, (i) implies (ii). We give necessary and sufficient conditions for (ii) to imply (i).

24. Beatty Sequences. By Ian Connell. Presented by N. S. Mendelsohn, F.R.S.C.

In 1926, S. Beatty showed that for any irrational $\alpha > 1$ the sequences $\{U_n\}$ and $\{V_n\}$ defined by $U_n = [n(1+1/\alpha)]$, $V_n = [n(1+\alpha)]$ are complementary. In this paper various arithmetic and asymptotic properties of these sequences are obtained. The connection between the sequences and partial fraction expansion of α is studied. For a particular class of Beatty Sequences the reduplication property

$$U_{V_n} = U_n + V_n$$

holds. The necessary and sufficient conditions under which reduplication holds is obtained and asymptotic values for the density of the set of N for which reduplication holds in the case where it is not universally satisfied are obtained.

25. A Structure Theory of Bipartite Graphs of Finite Exterior Dimension. By N. S. Mendelsohn, F.R.S.C. and A. L. Dulmage.

The authors define the concepts of irreducibility and induced graphs. These concepts enable one to decompose a graph into irreducible and minimal semi-irreducible components and also to determine the effect on the structure of a graph produced by the addition or deletion of edges.

The structure of an irreducible graph is also studied.

26. A Touching Problem with Circles. By John Satterly, F.R.S.C. (ret'd).

The problem of three touching circles has been revived and extended to include a fourth touching circle, touching the others either externally or internally. Soddy's Theorem, stated by him without proof but in verse, has been proven. The results are interesting.

27. Elastic Waves in Anisotropic Media. By G. F. D. Duff. Presented by G. de B. Robinson, F.R.S.C.

The propagation of elastic waves in a crystal or other anisotropic medium is governed by the hyperbolic system

$$\frac{\partial^2 u_p}{\partial t^2} = c_{pqrs} \frac{\partial^2 u_r}{\partial x^q \partial x^s}, \qquad p, q, r, s, = 1, 2, 3,$$

where the elastic constants $c_{pqrs} = c_{qprs} = c_{rspq}$ describe the symmetry of the medium. A solution of the Cauchy problem for these equations is determined by means of Fourier integrals. The speed of wave propagation in various directions is determined by the geometry of the slowness or normal surface of the system, and of its reciprocal the wave surface. The separation of the wave into sharp and continuous portions is established; the number of sharp waves and the duration of the continuous wave are determined. The effect on the wave form in the presence of double points on the slowness surface is shown to be that in certain directions the continuous wave precedes the leading sharp wave.

28. Mixed Initial and Boundary Value Problems for Systems. By G. F. D. Duff and M. Eisen. Presented by G. de B. Robinson, F.R.S.C.

Existence theorems for analytic systems of partial differential equations, containing an arbitrary number of dependent and independent variables, are presented in connection with mixed initial and boundary value problems. There are initial surfaces with Cauchy data, and boundary surfaces bearing a number of constraints equal to the number of characteristic surfaces within a certain region. In the non-linear case, the position of the characteristic surfaces must be determined as a part of the problem. This study establishes a link between the classical algebraic theory of existence of solutions, and the physically realistic theory appropriate for vibration problems with given boundaries.

SPECTROSCOPY

Wednesday, 9.00 a.m. Papers 29–35

29. Rotational Structure of 3914 Å N_2^+ Band in Sunlit Auroral Rays. By A. Vallance Jones. Presented by B. W. Currie, F.R.S.C.

Sunlit aurora rays were observed from Saskatoon on the evenings of September 3 and 4, 1958. A spectrum was obtained from the upper parts of the rays using an /0–8 grating spectrograph with a dispersion of 20 Å/mm. This spectrum showed a most unusual intensity distribution for the rotational fine structure of the 0, 0 3914 Å N_2^+ band. A plot of log (I/K') against $K'(K'+1)$ gave a rotational temperature of 2100° K. In addition there are considerable irregularities from line to line in the intensity distribution. The possibility of the occurrence of such irregularities in the rotational fine structure was pointed out by Swings, and thus appears to be the first observation of the effect in auroral spectra.

30. Theory of the Rotational Energy Distribution of Sunlit N_2^+ Molecules. By D. M. Hunten. Presented by B. W. Currie, F.R.S.C.

The spectrogram of the 3914 Å band reported by Vallance Jones in the preceding paper shows considerable deviations from a smooth rotational distribution. These are caused by the absorption of sunlight containing Fraunhofer lines. The process was analysed in detail for two different models:

(1) The rotational distribution in the ground state of N_2^+ is determined by the equilibrium between absorption and emission (radiative equilibrium).

(2) The ground state has a Boltzmann distribution at temperature 2100° K (thermal equilibrium).

The synthetic spectra were generally similar but showed considerable differences in detail; the second gave much better agreement with observation. Apparently the N_2^+ ions had a rotational distribution very close to Boltzmann; this is most easily interpreted as showing an atmospheric temperature of 2100° K at a height probably between 300 and 600 km.

31. The Inversion Spectrum of Ammonia in the ν_4 Vibrational State. By C. C. Costain. Presented by A. E. Douglas, F.R.S.C.

With a special absorption cell, which can be heated to 500° C to increase the population in the excited states, thirty-five lines of the pure inversion spectrum of NH_3 in the degenerate ν_4 vibrational state have been observed. The J, K rotational quantum numbers have been assigned to twenty-five of the lines. The interaction of the vibrational angular momentum with the rotation makes this inversion spectrum differ considerably from the well-known ground state inversion spectrum of NH_3.

32. Investigations of the Spectrum of Li^+. By G. Herzberg, F.R.S.C. and H. R. Moore.

The only two-electron system for which, so far, a Lamb shift has been determined is the He atom (Herzberg, Proc. Roy. Soc. *248A*, 309 (1958)). It appeared of interest to carry out an investigation for another two-electron system, Li^+. The final aim to obtain an accurate value for the ionization potential has not yet been accomplished. However, a preliminary value for the energy of the 2^1S state has been obtained, namely 134044.2 cm^{-1}. In deriving this value some difficulty was experienced because of the fact that the hyperfine structure for the higher levels of Li^+ is appreciably larger than the fine structure. A number of interesting features concerning the hyperfine structure have been found. In addition to the spectrum of normal Li^+ (predominantly $^7Li^+$) the strongest line at 5484 Å has also been studied for isotopically separated Li^6.

33. High Resolution Raman Spectroscopy of Gases. By E. H. Richardson, M. A. Thomas, and H. L. Welsh, F.R.S.C.

A Raman source of high intensity and a fast grating spectrograph are used to photograph vibrational Raman spectra of low pressure gases at a reciprocal linear dispersion of 6 cm^{-1} per mm. The use of the IBM 650 digital computer as an aid in the analysis of the rotational structure of vibrational bands will be discussed. Analyses of the spectra of CH_4, CH_3D, and C_3H_8 will be presented.

34. The Raman Spectrum of Solid Hydrogen. By Elizabeth J. Allin, S. Bhatnagar, and H. L. Welsh, F.R.S.C.

The Raman spectrum of solid hydrogen has been photographed at a reciprocal linear dispersion of 6 cm^{-1} per mm. The pure rotation, $S(o)$, the pure vibration $Q(o)$, and the

rotation-vibration, $S(o)$, lines have all been observed with pure parahydrogen. The pure rotation line appears as a triplet in which the components are very nearly equally spaced, in agreement with the theoretical prediction of Van Kranendonk. Observations of normal hydrogen have also been made. In this case there is no splitting of the $S(o)$ rotational line.

35. A General Survey of Meteor Spectra. By Peter M. Millman, F.R.S.C.

Up to the end of 1958 approximately 250 meteor spectra had been photographed. The great majority of these were obtained in one of three countries, Canada, the U.S.A., or the U.S.S.R. Most of the visible luminosity of meteors consists of the bright line spectrum of the neutral and first ionized states of atoms from the meteoric particle and the earth's atmosphere. There is also a minor contribution from the bands of molecules such as N_2 and possibly, in certain cases, a faint continuum of thermal radiation. General statistical relations found from a study of meteor spectra are discussed briefly.

GENERAL PHYSICS

Wednesday, 9.00 a.m. Papers 36–42

36. Definition of the "Second" in Terms of an Atomic Phenomenon. By S. N. Kalra. Presented by J. T. Henderson, F.R.S.C.

Recently a frequency and time interval standard using caesium beam magnetic resonance has been reported (Kalra, S. N., Bailey, R., and Daams, H., Can. J. Phys. *36*, 1442 (1958); Nature *183*, 575 (1959)). Experiments have since been in progress to study its implications. Results show that this technique can be used to define frequency and the unit of time interval in terms of an atomic phenomenon. Sensitivity of $1:10^{10}$ has been obtained.

The frequency of $F = 4$, $m_F \cong 0 \leftrightarrow F = 3$, $m_F = 0$ resonance transition in caesium has been measured every month in terms of a second of UT2 (as determined by the Dominion Observatory, Ottawa). These and the results of intercomparison against a similar apparatus at the National Physical Laboratory of England will be discussed.

37. Upgrading of Acceptability Criteria for Noise in Business Machine Offices. By T. F. W. Embleton, I. R. Dagg, and G. J. Thiessen. Presented by L. E. Howlett, F.R.S.C.

Following a noise survey of twenty-one offices devoted to card processing with business machines, it is suggested that the criteria for determining the acceptability of the background noise level may be upgraded by 5 or 10 decibels in those locations which meet certain specific acoustic requirements. These requirements are (i) very good acoustic absorption on both walls and ceiling; (ii) comparative absence of scattering objects; (iii) a height no greater than 12 feet; and (iv) a floor plan having its principal dimensions in a ratio between 1.2:1 and 1.6:1 and having its maximum dimension less than about 50 feet.

38. Anechoic Chamber of the National Research Council of Canada. By N. Olson, G. J. Thiessen, E. A. G. Shaw, and T. F. W. Embleton. Presented by L. E. Howlett, F.R.S.C.

The acoustic treatment of this anechoic chamber ($24' \times 17' \times 17'$) incorporates design features which reduce substantially the cost of the structure, with no sacrifice in performance. The wedges were sprayed with three coats of lacquer to improve the binding

of the fibreglas and thus facilitate handling. The only appreciable effect on the absorption at normal incidence was to lower the cut-off frequency from 85 c/s to 80 c/s. The wedges were wrapped in cheese-cloth which was then "stitched" by hot paraffin. The wedges were not pre-mounted but fastened directly onto the wall (in about 8 seconds each) by means of holders stamped out of sheet metal.

39. Vibration as a Quantitative Measuring Tool of Liquid Density. By G. J. Thiessen and I. R. Dagg. Presented by L. E. Howlett, F.R.S.C.

The vibrations resulting from an unbalanced rotor are not always unwanted and may be used as a sensitive measure of the density of a liquid. The accurate determination of volume which is usually necessary in density measurements may be eliminated with this method since excess volume of liquid can be distributed so that it contributes nothing to the off-balance. The vibration resulting from the off-balance is picked up from one resiliently mounted bearing and is a measure of fluid density. This is applied to the measurement of dilute pulp suspensions (less than 1 per cent) occurring in the paper-making process.

40. Low Gradient High Temperature Furnaces. By M. J. Laubitz. Presented by L. E. Howlett, F.R.S.C.

In many experiments, particularly those dealing with measurements of thermal conductivity, high temperature furnaces with extended regions of small temperature gradients are required. An investigation was undertaken in this laboratory to arrive at general design formulae to permit the construction of small cylindrical furnaces with extended gradientless regions. The problem was studied by means of an electrical analogue and by calculations with simplifying assumptions, and the results were checked by experiment. As an example, the design formulae led to the construction of a furnace 20 cms long which, with an input of 300 watts, had a region of 8 cms by 2 cms diam. at a temperature of $1000 \pm 5°$ C.

41. Low Thrust Rockets. By H. Preston-Thomas. Presented by L. E. Howlett, F.R.S.C.

The propellant requirement for a rocket rises logarithmically with increasing ratio of characteristic velocity to exhaust velocity. Chemically powered rockets, therefore, are severely limited in the payloads that they can carry between the inner planets and cannot travel to the outer planets within a reasonable time, that is, within two or three years. These limitations can, in principle, be overcome by the employment of nuclear (or possibly solar) energy sources and by using ion or plasma motors to accelerate the propellant to high exhaust velocities. These are necessarily low thrust systems; their performance possibilities are analysed and some current work on them is described.

42. Ocean Temperature—Depth Measurement. By T. M. Dauphinee. Presented by L. E. Howlett, F.R.S.C.

Some years ago this laboratory developed a method of using metal element resistance thermometers at locations remote from the measuring circuitry. This method has been applied to a rapid response direct reading copper resistance thermometer, the output from which is recorded and which is capable of operating to 0.01° C at ocean depths down to several thousand metres. Two systems have been developed for making the necessary associated depth measurements, one involving a resistance-pressure and the other a dielectric constant-pressure variation. Sea trials of the entire apparatus will be undertaken shortly.

Wednesday, June 3

2.00 p.m.—Business Meeting of Section III.

4.00 p.m.—Business Meeting of the Society.

7.30 p.m.—Joint Symposium with Canadian Association of Physicists on Cosmology.

Introduction. By Dr. G. M. Volkoff, F.R.S.C.
The Origin of the Elements. By D. A. G. W. Cameron.
Cosmological Models. By Professor H. P. Robertson.

INDEX, SECTION III

Light-face figures indicate the number of the article, bold-face figures the number of the page.

SECTION IV. GEOLOGICAL SCIENCES

Monday, June 1

2.00 P.M.—Business meeting of the Section.

3.30 P.M.—Session on Soil Science.

1. Modern Soil Science (Pedology) in Relation to Geological and Allied Sciences. By H. C. Moss. Presented by F. H. Edmunds, F.R.S.C.

An introduction to the viewpoint of the pedologist on the nature of the soil and the place of soil science among other earth sciences. To the pedologist the soil is an independent natural body and its study forms a distinct and separate branch of natural science. To explain this concept the soil-forming factors—climate, vegetation, parent material, topography, and time—are discussed briefly and the soil profile is defined. Monoliths of some Western Canadian soils are exhibited. In addition the following suggestions are presented and discussed:

(1) Natural soils should be identified and described according to the methods of pedology.
(2) Geological and related studies of the regolith should take account of pedological aspects.
(3) The soil classification and soil map can be a valuable aid to the interpretation of the geology and geography of a given area.
(4) A wider recognition and use of pedology in other sciences will assist pedological research.

2. Relation of Soils to Construction in Saskatchewan. By J. D. Mollard. Presented by F. H. Edmunds, F.R.S.C.

Tuesday, June 2

9.00 A.M.—Sectional Symposium on Evolution.

3. Presidential Address: Fossil Mammals and Intercontinental Connections. By Loris S. Russell, F.R.S.C.

Migration of Cenozoic mammals to and from North America took place via the Bering region and the Central American isthmus, the former being potentially the better connection. Intermingling of faunas between North America and Eurasia occurred in Late Paleocene, Early Eocene, Late Eocene to Early Oligocene, Middle to Late Miocene, Early and Middle Pliocene, Late Pliocene to Early Pleistocene, and mid-Pleistocene time. South America was isolated from North America during the great interval from Late Cretaceous or Early Paleocene time until well on in the Pliocene epoch. The Central American connection was imperfect at first but by the end of the Pliocene it had become a good migration route. There is a close correlation, at least for Tertiary time, between these episodes of faunal intermingling and the times of major diastrophism in North America.

4. The First Known Fauna, Lower Cambrian. By Vladimir J. Okulitch, F.R.S.C.

The oldest authentic fossil remains are found in the rocks of Lower Cambrian age. The late Precambrian "fossils" on closer examination, in most cases, turned out to be inorganic or of doubtful Precambrian age. During the last 30 years the separation of Precambrian

from Lower Cambrian actually became more definite, and the hope, often expressed, that eventually Precambrian fossils will be found has dimmed. Being the oldest known fauna, the Lower Cambrian fossils are necessarily the starting point of the observable evolutionary procession of life.

It is often stated in elementary textbooks of Historical Geology that the Cambrian fauna is one of considerable diversity, that most phyla are present, and that the organisms have reached a high degree of development. This is true only if the entire Cambrian period is considered. As a matter of fact, the Lower Cambrian epoch is very poor in the number of individuals and species. It is entirely marine, and is dominated by primitive trilobites and archaeocyathids. The phyla so richly represented in the subsequent epochs, such as Coelenterata, Brachiopoda, and Mollusca, are either absent or confined to very few species and to particularly favourable localities.

The paper lists Lower Cambrian fossils collected in a number of selected localities and emphasizes the paucity of species. The most common genera are discussed. It is also demonstrated that most of the genera have very wide geographical distribution. Very few of the Lower Cambrian forms continued into the Middle Cambrian. It is also very difficult or impossible to trace the descendants of the Lower Cambrian times into the Middle Cambrian.

5. Evolutionary Trends from the Ordovician to the Close of the Paleozoic Era. By M. Y. Williams, F.R.S.C.

Invertebrates, primitive vertebrates, and plants represent in their fossil records gradual development throughout the Paleozoic era under the control of changes in land and sea. At the close of the era, a rich and varied marine life was contemporaneous with an equally varied land life including arthropods, Amphibia, and primitive reptiles living among giant spore-bearing plants and primitive conifers. From the widespread epeiric and shelf-seas of the Ordovician the continents rose through alternate stages of mountain building and progressively lessening submergence to widespread land areas. Marine and land life adjusted itself accordingly.

6. Parallel Evolution in some Ordovician Cystoidea. By G. Winston Sinclair. Presented by J. F. Caley, F.R.S.C.

The name parallel evolution, or convergent evolution, has been given to the process whereby unrelated, or only distantly related, animals develop in ways so similar that superficially identical forms result. As the fossil record is studied in more detail, more and more examples are being recognized. A particularly striking example will be described in which parallel evolution between primitive echinoderms of primitive stocks occurred in several different directions. One new genus and several new species are involved, and will be described.

A genetic model will be offered as an attempt to account for the observed behaviour, with the suggestion that parallel evolution is explicable in terms of classical evolutionary theory. If the model is correct, parallelism should not be a rare exception to a rule, but rather a common form of evolution in simple animals.

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7. Evolution of the Mississippian *Lithostrotion mutabile-Lithostrotion whitneyi* Coral Group of the Southern Canadian Rockies. By Samuel J. Nelson. Presented by P. S. Warren, F.R.S.C.

The possible evolutionary history of the Mississippian fasciculate corals *Lithostrotion mutabile* (Kelly), *L.* n.sp., *L. whitneyi* Meek, and *L. arizelum* (Crickmay) is suggested.

Evolution of the group has usually been towards increase in corallite size, accompanied by increase in number and length of major septa; also increase in tabular inclination, number of dissepiments, and width of dissepimentarium. Longitudinal patterns of structures of immature corallites of one horizon usually mimic structures of species of the preceding horizon.

2.00 P.M.—Geophysics and Geochemistry.

8. A Gravity Investigation of the Deep Bay Crater. By M. J. S. Innes. Presented by J. M. Harrison, F.R.S.C.

Certain circular topographic features of the Canadian Shield produce negative gravity fields. These are believed due not only to low density sedimentary rocks now filling these depressions but also to underlying fragmental material and disturbed bedrock conditions which resulted from uplift and fracturing accompanying formation of the craters. Gravity measurements in March 1959, on the ice of Deep Bay, a crater 8 miles in diameter, forming the southeastern part of Reindeer Lake in Saskatchewan, indicate a gravity minimum of 32.5 milligals. This anomaly corrected for terrain and water depths indicates that the undisturbed floor of the crater lies at a minimum depth of 2,550 feet, or 1,440 feet below sea level. This new information considerably strengthens the meteoric theory of origin for Deep Bay. On the basis of known meteorite-impact craters the predicted depth below sea level for a crater of similar diameter and surface elevation is about 1,500 feet.

9. Radiocarbon-dated Organic Sediment near Herbert, Saskatchewan. By W. O. Kupsch. Presented by F. H. Edmunds, F.R.S.C.

Organic sediments from a depth of 11 feet near Herbert, Saskatchewan, contain willow wood which has been radiocarbon dated at 10,050±300 years B.C. The sediments contain in addition to the wood a faunule of predominantly snails and ostracodes. Plant fragments are common and include a few spruce cones. Marl with abundant remains of algae (*Chara*) is locally present. Spores and pollen recovered from the sediment provide an insight into the type of vegetation at the Herbert site, 10,000 years ago.

Both fauna and flora indicate sedimentation in quiet water of a pond or small lake surrounded by a mixed wood open forest with black and white spruce, jack pine, and birch, willow, and probably aspen. Such an environment exists today in the forest belt of Saskatchewan, 200 miles to the north of Herbert. The change from forest to grassland, which now prevails near Herbert, is indicated by pollen analyses of the sediments overlying the radiocarbon dated wood.

10. Gravity Measurements on the Salmon Glacier and Adjoining Snowfield, British Columbia. By J. A. Jacobs, F.R.S.C. and R. D. Russell.

The reduction of the gravity data is complicated by the extreme irregularity of the terrain and by the fact that the structure of the glacier, as well as the location of the stations, are time dependent. Free air anomalies and Bouguer anomalies are calculated and two profiles across the glacier are drawn, and also one along its length. The accuracy of the results is discussed in some detail—it is concluded that gravity measurements alone can give a very good indication of the shape of a deep valley glacier and also its approximate depth. Other independent data are necessary to determine its precise thickness.

11. Potassium-Argon Age of Biotites from Cordilleran Granites. By H. Baadsgaard and R. E. Folinsbee, F.R.S.C.

Twenty Cordilleran plutons have yielded a geologically consistent pattern of age results agreeing with zircon data, relative rather than absolute because of argon leakage. The Ice

River syenite is 370 m.y. old, Ordovician by Holmes scale, Devonian by M.I.T.; Guichon (220 m.y.) is Permo-Carboniferous; Topley is 165 m.y., late Triassic; no late Jurassic granites have been dated. Large intrusives, including Coast Range, are mid-Cretaceous (100 m.y.); a few such as Boulder and Bayonne are late Cretaceous, 85–75 m.y. Smaller intrusives, including Nelson batholith, are early Tertiary, 50–60 m.y.; the youngest granitic biotites (18–20 m.y.) occur in the Cascade Range. The age pattern agrees with White's tectonic history. Incidence of ages 370 (Taconic-Caledonian-Acadian), 220 (Hercynian-Appalachian), 100 (mid-Cretaceous), 60 (Alpine), in the Cordillera suggest world-wide and coincident orogenic events.

12. Sulphur Isotope Investigation of the Gold-Quartz Deposits of the Yellowknife Region. By R. K. Wanless, R. W. Boyle, F.R.S.C., and J. A. Lowdon.

Sulphides occurring in the main orebodies and their associated halos, the metamorphic facies of the greenstone belt, and the neighbouring granite mass have been examined in detail. The majority of the specimens studied are slightly enriched in the heavy isotope with respect to the meteoritic standard. While the over-all range is small (about 1.5 per cent), significant variations were found between the granite and the metamorphic facies of the greenstone belt. A direct correlation exists between the isotopic ratio and the distance from the granite contact; sulphides in the granite are the most enriched in the heavier isotope whereas the metamorphic facies are progressively depleted in S^{34} as the distance from the granite increases. Sulphides in early tension fractures are consistently lighter (i.e., contain more S^{32}) than the sulphides occurring in the surrounding greenstones, while sulphides in the later gold-quartz lenses are heavier than those in their associated alteration zones. In addition, profiles across the country rock, alteration zones, and gold-quartz lenses indicate that the heavy isotope has been preferentially retained in the alteration zones with the maximum enrichment occurring in the ore. However, in late quartz-carbonate lenses cutting the alteration zones and orebodies the lighter sulphur isotope has been preferentially concentrated.

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13. Zinc and Copper Relationships in some Eruptive Rocks. By Harry V. Warren, F.R.S.C. and Robert E. Delavault.

Using the hot aqua regia attack on carefully prepared suites of eruptive rocks collected from various areas in southern British Columbia, widely differing zinc and copper contents have been observed. The absolute and relative amounts of zinc and copper vary widely in different eruptive rocks. These differences can be correlated with comparable samples taken from appropriate stream sediments, and with the presence of significant mineralization, if any, in the vicinity. Copper to zinc ratios, when considered in conjunction with absolute amounts of copper and zinc in rocks, assist materially in evaluating the potentialities of any particular eruptive rock.

Wednesday, June 3

9.00 A.M.—General Session.

14. Structure of the Whitemud Formation near Claybank, Saskatchewan. By A. R. Byers, F.R.S.C.

Detailed mapping in the vicinity of Claybank, Saskatchewan, has shown that the Whitemud and the immediately overlying and underlying formations have been isoclinically

folded and thrust faulted into a series of subparallel, overturned folds and thrust blocks. A study of aerial photographs indicates that this deformation of the Whitemud is not confined to the vicinity of Claybank but occurs throughout the area of the Dirt and Cactus Hills. The structures are considered to have been produced by the subglacial drag of a Pleistocene ice sheet.

15. Pleistocene Stratigraphy of the Swift Current Area. By E. A. Christiansen. Presented by F. H. Edmunds, F.R.S.C.

Three Wisconsin till sheets (Wymark Till, Aikins Till, and Leinan Till) and the end moraines for the latter two occur within the Swift Current area. These till sheets are separated by fluvial and lacustrine sands, silts, and clays which were deposited during the retreats and advances of the ice sheets. The lack of weathering, except for oxidation, and the extreme youthfulness of the landscape upon these till sheets indicate that they represent local fluctuations of the glacier during the major retreat. A thin blanket of loess, which is post-Aikinsian pre-Leinanian, was derived from the outwash lacustrine plain west of the city of Swift Current. The montmorillonite (most abundant clay mineral) and illite in the tills and loess were derived from the Upper Cretaceous Bearpaw formation whereas the kaolinite was derived from the Whitemud formation of the same series. Preliminary studies indicate that the tills are similar in clay mineral and heavy mineral content, plastic properties, and texture.

16. Terrain Appraisal from Airphotos for Construction Projects in Northern Saskatchewan. By J. D. Mollard. Presented by F. H. Edmunds, F.R.S.C.

An accelerated programme of engineering surveys in Saskatchewan's northland has given impetus to the appraisal of terrain conditions imaged in the airphotos of that region. These studies usually begin by diagnosing the origin and composition of different landscape forms. Surficial geology, topography, drainage, and vegetation are systematically considered and evaluated in terms of their engineering and construction significance. These appraisals have been carried out for a number of site-analysis studies, highway-location investigations and construction-material searches. Techniques used, results obtained, and their relation to follow-up field study are illustrated by maps, tablets, annotated airphotos, and ground pictures.

17. Microclines from a Precambrian Granodiorite. By J. R. Smith and M. W. Pyke. Presented by J. B. Mawdsley, F.R.S.C.

With the purpose of elucidating the relations between orthoclase and microcline in the Precambrian rocks of Saskatchewan, more than 100 specimens from a small, well-defined, oval-shaped body of massive granodiorite and quartz diorite have been studied. Modal analyses show that the body consists of an off-centre core of quartz diorite (microcline less than 10 per cent of total feldspar) surrounded by granodiorite (microcline more than 10 per cent of total feldspar). X-ray studies of the microclines show that in the granodiorite near the margins of the body, the microclines have maximum "triclinicity" (departure from monoclinic symmetry). The triclinicity decreases markedly towards the quartz diorite core; within it, microclines of relatively low triclinicity are accompanied by some orthoclase with true monoclinic symmetry. The evidence afforded by these observations is used in the interpretation of the igneous history of the body.

18. New Data on Haliburton-Bancroft Nepheline Rocks. By J. Gittins. Presented by H. S. Armstrong, F.R.S.C.

Nepheline syenites of indisputably igneous origin are recorded from Glamorgan and Monmouth Townships, Ontario, where only nepheline gneisses were formerly known. Their igneous texture, mineralogy, and chemistry are reviewed. Nepheline gneisses of this classic region are produced by the regional metamorphism of igneous (magmatic) rocks and nephelinized meta-sedimentary rocks and are thus of two types. Nephelinization is attributable to a nepheline syenite magma and not to tenuous solutions from a granitic or any other source.

19. A Gravity Map of Canada. By M. J. S. Innes. Presented by S. C. Robinson, F.R.S.C.

All regional gravity measurements of the Dominion Observatory to the end of 1956 have been compiled in the form of a Bouguer anomaly map on a scale of 100 miles to an inch. The anomalies which have a range of 265 milligals are quite variable but in some areas maintain their same sign and magnitude over great distances. The interpretation of these larger gravitational features observed in the Canadian Shield are presented in relation to the major geological elements. Statistical examination of isostatic anomalies indicates a marked gradient outward from Hudson Bay which suggests that isostatic uplift of the crust is not yet complete following deglaciation.

20. A Comparison of some Aspects of the Geology of an Area in Rajasthan, India, with that of the Blind River Area in Ontario. By Duncan R. Derry, F.R.S.C.

2.00 P.M.—Sectional Symposium on Evolution (*cont'd*).

21. Evolutionary Trends within Gastroplitan Ammonoids. By P. S. Warren, F.R.S.C. and C. R. Stelck.

Middle Albian *Gastroplites* descended from cosmopolitan *Beudanticeras*-like ammonites and developed local genera such as the Upper Albian *Neogastroplites* and the Lower Cenomanian *Beattonoceras* and *Irenicoceras*. Relationships are postulated with allied genera such as *Cleoniceras, Lemuroceras, Subarctoplites, Freboldiceras, Coloboceras, Metasigaloceras,* and *Acanthoceras*.

22. Evolution of Dental Systems in the Lower Tetrapods. By A. G. Edmund. Presented by L. S. Russell, F.R.S.C.

Studies of the changes in molar cusp patterns have been the most useful tool in determining evolutionary relationships in fossil mammals, but little work has been done on the evolution of sub-mammalian dentition. Comparative work on the lower tetrapods indicates both a continuity and an integrated change in many factors such as type of implantation, tooth form, and sequence and mode of replacement. Evolution within relatively small groups, such as the hadrosaur dinosaurs, or over great spans such as from Devonian crossopterygians to mammal-like reptiles can be demonstrated. With few exceptions, the basic scheme of alternate tooth replacement has been the rule for over three hundred million years.

3.00 P.M.—General Session (*cont'd*).

23. A Larval Stage of the Trilobite *Pseudogygites latimarginatus* (Hall). By Madeleine A. Fritz, F.R.S.C.

A specimen approximately 4 mm in length collected by Jane McNeill, a graduate student at the University of Toronto, in October 1958 from the Craigleith formation (Upper Middle Ordovician) on the shore of Georgian Bay near Craigleith, represents Degree 3 of the Meraspis period (in other words, the third meraspid moult) of the species *Pseudogygites latimarginatus* (Hall) formerly, and perhaps more widely, known as *Ogygites canadensis* (Chapman). The species is the characteristic index fossil found at the above horizon not only on Georgian Bay but elsewhere as well. Adult specimens occur in great profusion in southern Ontario but, to my knowledge, no larval stages have been found; at least, none has been described. The present specimen is of considerable interest in that it furnishes significant information on the ontogeny of a widely known species.

24. Uppermost Jurassic and Lowermost Cretaceous Zones of the Canadian Western Cordillera. By J. A. Jeletzky. Presented by H. Frebold, F.R.S.C.

Upward zonal sequence is:

1. Upper Tithonian. *Buchia* (= *Aucella*) *piochii* zone (= *Craspedites* zones = *Virgatosphinctes transitorius* zone).

2. Lowermost Berriasian? *Buchia blandfordiana* (= *Aucella* ex gr. *rugosa* Jeletzky, 1950) zone.

3. Berriasian. 3*a*. *Buchia okensis* (= *Aucella cascadensis*) zone (= Ryasanian beds = *Berriasella callistoides* zone). 3*b*. *Buchia uncitoides*, *Spiticeras gigas*, and *Neocomites*? cf. *inequicostatus* zone (= *Thurmannites bossieri* zone).

4. Lowermost Valanginian? *Buchia americana*, *Craspedites* cf. *tolli*, and *Craspedites* cf. *simplex* zone (? = *Craspedites stenomphalus* zone).

5. Valanginian. 5*a*. *Buchia crassa*, *Craspedites* cf. *mutabilis*, and *Neocomites* cf. *rota* zone (? = *Polyptychites keyserlingi* zone). 5*b*. *Buchia crassicollis* and *Dichotomites quatsinoensis* (= *Holcodiscus*? *stantoni* = *Homolsomites poecilochotomus*) zone (= *Polyptychites polyptychus* zone).

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SECTION V. BIOLOGICAL SCIENCES

Monday, June 1

2.00 P.M.—Business Meeting of Section (Room 218, Medical Building).

Tuesday, June 2

9.00 A.M.—General Session (Room 218, Medical Building).

1. Factors Influencing Infection of Grasses and Legumes by Snow Mould Fungi. By M. W. Cormack. Presented by D. S. Rawson, F.R.S.C.

In nature, snow mould damage is markedly influenced by temperature, moisture, snow cover, and other factors. Under artificial conditions, *Typhula* spp. and the low-temperature basidiomycete, which is prevalent in Western Canada, caused maximum damage after two months at 2° C and 80 to 90 per cent R.H. A saturated atmosphere retarded mycelial growth and infection. Greenhouse grown plants were first conditioned for two weeks at 5° C, with light for eight hours daily. Freezing temperatures and snow cover were not required. Favourable conditions were not found for development of *Sclerotinia borealis*, which occurs in extreme northern areas.

2. An Evaluation of Elk Winter Range in Southwestern Alberta. By G. J. Mitchell and R. G. H. Cormack, F.R.S.C.

This paper reports the results of a field study made to determine the condition of the vegetation on several important elk winter ranges in the mountainous southwestern part of Alberta. Here, the winter ranges must not only accommodate big game animals from a much larger surrounding summer range, but must support a large number of sheep and cattle during the summer months as well. With the encroachment of settlement and agriculture, the winter range is the limiting factor for the welfare of elk in this region. Range conditions are described briefly and the results related to sound game management practices.

3. The Evolution of Stability: Natural Selection at the Level of the Ecosystem. By M. J. Dunbar, F.R.S.C.

Starting from the premiss that oscillations in ecosystems are bad, and that violent oscillations may be lethal to component species or to whole systems, the stable systems of tropical regions, both terrestrial and marine, are contrasted with the unstable systems of higher latitudes. Both are related to climate, and since the cold and oscillating climates of the higher latitudes are palaeontologically young, the oscillating ecosystems are considered to be imperfectly adapted. Evidence of evolution towards stability is offered, and the selective process is shown to involve competition between whole systems rather than between species or individuals.

4. Climatology of Grasshopper Populations in Saskatchewan during the Period 1935–58. By R. L. Edwards. Presented by J. G. Rempel, F.R.S.C.

Records of weather data issued during the past twenty-four years from a number of selected weather stations in Saskatchewan are compared with records of grasshopper

population densities recorded in the same areas during the annual grasshopper surveys. The degree of correlation between single weather factors and grasshopper population densities is discussed in relation to the life cycle of the main economic species.

5. The Origin of the Metazoa. By J. R. Nursall. Presented by R. F. Shaner, F.R.S.C.

It seems likely that for the greatest part of its time on this planet life existed anaerobically. For several reasons it appears to be possible that the Metazoa, and perhaps life itself, arose from several origins. It is suggested that the conditions of environment and limitations of evolution that have existed on earth may have resulted in a tendency to similarity in animals that has given a spurious indication of monophylety.

6. Midge-Pollination of Cocoa (*Theobroma cacao*). By L. G. Saunders. Presented by D. S. Rawson, F.R.S.C.

The only proved pollinators of cocoa flowers are female midges of the genus *Forcipomyia* (Diptera, Ceratopogonidae). It will be shown that all identified species belong to the subgenera *Proforcipomyia* or *Thyridomyia*. The need for knowledge of the biology of these midges will be discussed, and the search for larvae in Costa Rica and Trinidad described. Methods for rearing larvae on natural and artificial media will be added.

7. The Evolution of Pelagic Hydroids: Evidence from Behavioural Studies. By G. O. Mackie. Presented by R. G. H. Cormack, F.R.S.C.

Porpita and *Velella*, though traditionally classified with the siphonophores, are better regarded as an independent group having strong affinities with sessile, gymnoblastic hydroids. Evidence for this comes chiefly from comparative anatomy and development but a study of the behaviour of *Porpita* has now revealed behavioural homologies with sessile forms such as *Corymorpha*. It is suggested that the life of a pelagic hydroid is not greatly different from that of a sessile hydroid.

8. Sporogony of Species of *Leucocytozoon* and *Haemoproteus* and Relationships of the Parasites to other Sporozoa. By A. M. Fallis, F.R.S.C.

The sexual development of species of *Leucocytozoon* and *Haemoproteus* has been followed in ornithophilic black flies and biting midges respectively. Rapid ex-flagellation of the male gametocytes occurs in both types of parasites. All, or most, of the pigment in the motile zygote of *Haemoproteus* is pinched off before its development into the oöcyst occurs. Small oöcysts (10–15 μ in diameter) are characteristic of both types of parasites. Mature oöcysts contain relatively few sporozoites and a residual body. The sporogony suggests relationships of these parasites to each other and to other members of the Sporozoa.

9. On the Biology of some Avian Trypanosomes. By G. F. Bennett. Presented by A. M. Fallis, F.R.S.C.

The capacity of various avian trypanosomes to develop in black flies, biting midges, deer flies, louse flies, and *Aedes aegypti* has been tested experimentally. The parasites developing in these insects have been transferred artificially by intraperitoneal inoculations to various birds to determine the suitability of the insects as intermediate hosts and the specificity of the trypanosomes for the birds. The results indicate the course of development of these trypanosomes and suggest that they are more specific for the invertebrate than for the vertebrate host.

2.00 P.M.—Special Symposium on Evolution (Room 218, Medical Building).

10. Evolution and Industry. Presidential Address by N. H. Grace, F.R.S.C.

11. A Biochemist Looks at Evolution, Past and Future. By B. F. Crocker. Presented by C. S. Hanes, F.R.S.C.

12. Biosystematics and the Processes of Speciation. By Askell Löve. Presented by Pierre Dansereau, F.R.S.C.

13. The Evolution of Bacteria. By R. G. E. Murray, F.R.S.C.

14. The Evolution of Parasites in the Phylogeny of their Hosts. By T. W. M. Cameron, F.R.S.C.

Wednesday, June 3

9.00 A.M.—General Session (Room 218, Medical Building).

15. Regulation of Plasma Calcium—A Study in Homeostasis. By D. Harold Copp. Presented by Edgar C. Black, F.R.S.C.

Although less than 0.1 per cent of the body calcium is present in blood and extracellular fluid, this calcium plays a vital role in many processes, and is perhaps the best regulated constituent of plasma. In over 400 determinations in normal dogs, the plasma calcium was 9.89±0.54 (std. dev.) mg. per cent. This remarkable constancy is maintained despite addition of variable amounts of calcium absorbed from the intestinal tract or released l bone resorption, and removal of calcium by excretion in urine and feces and by deposition in bone.

The homeostatic control of plasma calcium depends primarily on bone, kidneys, and parathyroid glands. When hypercalcemia was induced in normal dogs and human subjects by intravenous infusion of calcium gluconate (10 mg. Ca/kg. over a one-hour period), normal levels were restored in 4–8 hours. During the hypercalcemia, increased calcium excretion in urine was directly proportional to the increase in plasma calcium with an estimated Tm(Ca) = 4.5–6.0 mg. Ca/min. Concentration-time curves for plasma calcium were analysed with an electronic analogue computer, and gave mixing times corresponding to an estimated bone-blood flow of 200–400 ml./min. in normal subjects, and 1–2 liters/min. in patients with Paget's Disease. The plasma calcium level appeared to be "buffered" by a labile calcium reservoir in bone, which in normal human subjects amounted to approximately 2½–5 grams (30–80 mg./kg. in dogs). When hypocalcemia was induced by intravenous infusion of sodium EDTA, similar curves were obtained. When the parathyroid glands were removed in dogs, the plasma calcium level fell within 12 hours to a level of 4–8 mg. per cent (5.84±1.15), and its regulation was impaired. Continuous intravenous infusion of parathyroid extract at 1 unit/kg./hr. was sufficient to restore the normal calcium level in a parathyroidectomized dog within 10–14 hours; 0.1 unit/kg./hr. was sufficient to maintain this level. There was usually a latent period (20–40 minutes) before a rise in blood calcium became apparent; the effect persisted for several hours after the infusion was discontinued. This suggests that the hormone acts through a secondary cellular mechanism in bone.

The experiments suggest that a "labile" reservoir in bone acts as a buffer to reduce fluctuations in plasma calcium; that renal excretion is the most important factor in restoring the normal level after calcium infusion; and that the parathyroids have an important role in restoring the normal level after induction of hypocalcemia.

(Aided by a grant from the Division of Medical Research, National Research Council of Canada.)

16. The *in vivo* and *in vitro* Degradation of a Systemic Vinyl Phosphate and the Relative Toxicity of its Thiono Sulphur Analogue. By E. Y. Spencer. Presented by N. H. Grace, F.R.S.C.

The more reactive isomer of Phosdrin (0,0-dimethyl 0-2-carbomethoxy-1-methyl vinyl-phosphate) has only a two-day life in the plant by contrast with two or three weeks for most other systemic organophosphorus compounds. The degradation of both isomers has been studied in alkali and the pea plant. Identification of the chief degradation products indicates some differences in the hydrolysis of the two isomers. The thiono sulphur analogue has a much lower mammalian toxicity yet retains much of its insecticidal activity.

17. The Effect of Amino Triazole on the Metabolism of Plants. By D. J. Wort. Presented by R. G. H. Cormack, F.R.S.C.

Warburg techniques showed that a 4,000 ppm spray of 3-amino-1,2,4 triazole applied to tops resulted in an immediate increase in respiration of bean leaves. This was 118 per cent of control within 2 hours and 232 per cent in 96 hours. Photosynthetic rate fell to 75 per cent by the second hour and declined thereafter. A similar response was measured in wheat leaves. Spectrophotometric techniques showed that 10^{-3} *M* amino triazole increased the rate of oxidation of reduced cytochrome *c* by 21.8 per cent. The same concentration also increased the activity of phenolase and laccase in sugar beet root discs and of ascorbic acid oxidase in barley. The protonated form of amino triazole is more active than the free base. Its action appears not specific as far as these enzymes are concerned.

18. Structure and Functions of the Erythrocyte Membrane. By H. Bruce Collier, F.R.S.C.

Some properties of the stroma of mammalian erythrocytes will be reviewed under the following headings: current information on chemical composition and structure; surface enzymes; active transport of cations in relation to cell metabolism and surface architecture; the effects of tocopherol deficiency; thiols and erythrocyte integrity.

19. Glycogen Levels for Muscle and Liver in Spawning Kamloops Trout, *Salvelinus gairdneri*, Following Exercise. By Edgar C. Black, F.R.S.C. Wing-Gay Chiu, Kwok-Cheung Lam, and Arthur R. Hanslip.

During the 1957 spring run of spawning Kamloops trout at Summerland, British Columbia, studies were made on carbohydrate metabolism during severe muscular exercise. The average muscle glycogen for 10 unexercised trout was 0.38 ± 0.205(S.E.) grams per 100 grams of wet tissue. Average value for 17 trout after 15 minutes of exercise was 0.05 ± 0.082 per cent. Respective average levels for liver glycogen were 0.83 ± 0.421 per cent for 10 unexercised fish and 0.60 ± 0.192 per cent for 16 exercised fish. These data, together with data for blood glucose and lactate, will be discussed briefly.

20. Biosynthesis of Pungenin. By A. C. Neish. Presented by G. A. Ledingham, F.R.S.C.

Pungenin (3,4-dihydroxyacetophenone monoglucoside) is a major water-soluble constituent of the leaves of Colorado spruce and of white spruce. The biosynthesis of pungenin was studied by feeding a variety of C^{14}-labeled compounds to spruce cuttings and measuring the extent to which they were incorporated into pungenin. Caffeic acid, L-phenylalanine, cinnamic acid and *p*-coumaric acid were good precursors of pungenin aglycone while mandelic acid, phenylacetic acid and L-tyrosine were not utilized appreciably. A con-

sideration of these and other data suggests that the dihydroxyacetophenone is formed from an intermediate of lignification but does not itself contribute directly to lignin formation.

21. Porphyrin Synthesis in Yeast Fermentation. By W. D. McFarlane, F.R.S.C.

In the course of anaerobic fermentation by *saccharomyces cerevisiae* a colourless, non-fluorescent porphyrin is produced. Its presence in the media is detected through its ready oxidation to a pink-coloured, red fluorescent porphyrin which we have identified as coproporphyrin III. The concentration of the chromogen reaches a maximum just at the end of fermentation, and hence it appears to be related to active fermentation. However, its presence is not detected during the course of aerobic fermentation.

Part of the coproporphyrin in the media occurs as the copper complex which appears to combine readily with protein. Evidence will be presented to indicate that these compounds are also present in the yeast cell, the concentrations being markedly influenced by the presence of oxygen during fermentation. The possible significance of these findings in relation to heme synthesis will be discussed.

22. L'une des premières flores canadiennes. Par Jacques Rousseau, M.S.R.C.

L'auteur présente une étude sur un manuscrit inédit des débuts du dix-huitième siècle. Cette flore révèle une connaissance précise de la végétation de la vallée du Saint-Laurent, tandis que la flore antérieure de Cornut était basée uniquement sur les espèces canadiennes alors en culture en France.

23. The Evolutionary Significance of Barrier Penetration. By D. B. O. Savile. Presented by A. Senn, F.R.S.C.

If two land masses are effectively separated for substantial periods each acquires a relatively stable biota; but the two biotas are appreciably different, the organisms in each are subject to strong, persistent competition and all are highly adapted to existing conditions. Consequently, almost all mutations are inadaptive and evolution is restricted. If an organism penetrates the barrier and survives, it is no longer in balance with the community, some of its mutations are now adaptive, and it may radiate strongly. The penetration of ecological or physiological barriers may similarly give rise to evolutionary outbursts.

24. Synthesis of Phloridzin and Related Phenolic Compounds in Malus Tissues from Cinnamic Acid-2-C^{14}. By P. N. Avadhani and G. H. N. Towers. Presented by R. Darnley Gibbs, F.R.S.C.

Malus leaves have been found to contain phloridzin, phloretin, chlorogenic acid, *p*-coumaric acid, phloretic acid, and traces of ferulic acid. A. Hutchinson has shown that the B ring and the C_3 moiety of phloridzin may be formed from phenylalanine-C^{14} and tyrosine-C^{14}. We have administered cinnamic acid-2-C^{14} to *Malus* tissues and studied the changes with time in the distribution of carbon among the phenolic substances. The results of these studies will be discussed in relation to phloridzin biogenesis.

Section V, Wed. p.m.

2.00 P.M.—General Session (Room 218, Medical Building).

25. Flavelle Medallist's Address. By M. L. Barr, F.R.S.C.

3.00 P.M.

26. The New Method of Alpha Ray Microradiography Applied to the Study of Chick Cartilage. By Leonard F. Belanger, F.R.S.C. and B. B. Migicovsky.

A technique of microradiography recently described consists of exposing tissue sections mounted on NTA nuclear emulsion plates to an alpha beam from a Polonium 210 source. This procedure produces in the photographic emulsion a gradation of shadows related to the density of the tissues. The epiphyseal cartilage of the long bones of chicks shows density variations from the articular surface towards the zone of bone formation. Considerable differences were also recorded when normal and rachitic animals were "alpha-radiographed" and also when rachitic animals were treated with cortisone, nor-testosterone, or vitamin D. These results are interpreted in the light of parallel histochemical studies of mucopolysaccharides.

27. Cell Variants in Tissue Culture. By S. Fedoroff. Presented by L. B. Jaques, F.R.S.C.

By treating Earle's strain *L* cells, derived from mouse subcutaneous tissue, with toxic human serum, it was possible to develop strains of variant cells. One such variant strain (L_E) differed from the parent strain (L_1) by a marked decrease in its sensitivity to toxic human serum. This decrease was concommitant with a decrease in the ability of strain L_E to absorb toxic substances from human serum. Further, it was found that strain L_1 cells have at least two types of loci at which toxic substances can be bound, whereas strain L_E cells have only one locus.

28. Evolution of Tumor Cells. By H. F. Stich. Presented by Dr. L. B. Jaques, F.R.S.C.

Whereas the evolution of species due to maturation and selection is a well-established theory, the evolutionary processes of somatic cells in the life span of one individual have never been seriously pursued. The aneuploid chromosome numbers and the "new" chromosomes present in tumors of different mammals including man indicate the existence of genetic changes in somatic tissue. An understanding of the mechanism underlying these genetic alterations appears to be of great importance since it may throw light on the transformation of normal cells into malignant cells. Abnormal genetic compositions of somatic cells and the steps leading to them will be exemplified with human as well as experimentally induced tumors.

29. The Nuclear Origin and Subsequent Development of Plastids in Leaves of Douglas Fir and Other Conifers. By A. H. Hutchinson, F.R.S.C.

Evidence is submitted for the nuclear origin of proplasts, particularly chloroplastic, emitted in chains from nuclear orifices; similarly xyloplastic proplasts which develop into bordered pits and phloeoplasts which become effective as sieve plates. The multiplication of chloroplasts by budding and their functional changes are photographically presented.

30. The Relation of Bark Moisture to the Development of Fusarium Canker on Poplar. By John E. Bier. Presented by A. H. Hutchinson, F.R.S.C.

A close correlation was found to exist between the development of Fusarium canker (*Fusarium lateritium* Nees) on *Populus trichocarpa* Torrey and Gray and the relative turgidity of the living bark. Relative turgidities of 80 per cent or more inhibited canker development which, however, occurred normally at lower percentages. The epidemiology of Fusarium canker on black cottonwood has been correlated with variations in relative turgidity caused by seasonal and soil factors. The varietal resistance of poplars to this disease is related to physiological and anatomical factors of the bark which provide for the maintenance of a relative turgidity above the 80 per cent level.

31. The Significance of Plant Microfossils Found in Canadian Devonian. By N. W. Radforth and L. Wilkinson. Presented by G. Krotkov, F.R.S.C.

Plant microfossils recently procured from selected strata of one of Dawson's Devonian locations are considered in relation to the fossil macroflora of the same age and location. They suggest presence of a wider conspectus of species than that which the macroflora indicates. Also, they point to a probability that greater biological diversity prevailed than had been thought to be the case. This gains confirmation when comparison is made with other Canadian Devonian microfloras.

32. Definitive Microfossils Pertinent to Physiographic Difference in Muskeg. By N. W. Radforth and L. S. Suguitan. Presented by G. Krotkov, F.R.S.C.

Topographic character in organic terrain, though it can usually be typified, is often difficult to delineate. Where physiographic states appear to merge to form a complex, certain microfossils seem to assist in interpreting physiographic genesis for given locations within the complex. Microfossils in the peat at these locations seem significant as to both identity and frequency.

33. The Physics of "Bolus-Flow," as of Erythrocytes in the Capillary Circulation. By A. C. Burton, F.R.S.C. and J. Prothero.

Many capillaries allow red cells to pass only one at a time, and often the red cells must be deformed. The physics of this peculiar "bolus-flow" has been investigated by using models of bubbles separated by water passing down glass tubes. The "interbolic" fluid (plasma in capillaries) has a whirlpool-like motion that effectively mixes it completely. Equilibrium with respiratory gases, in lung or peripheral capillaries, must be greatly facilitated. This has been investigated using flow of heat in a model. Viscous resistance to this pattern of flow is greater than for the "Poiseuille" type of streamlined flow.

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